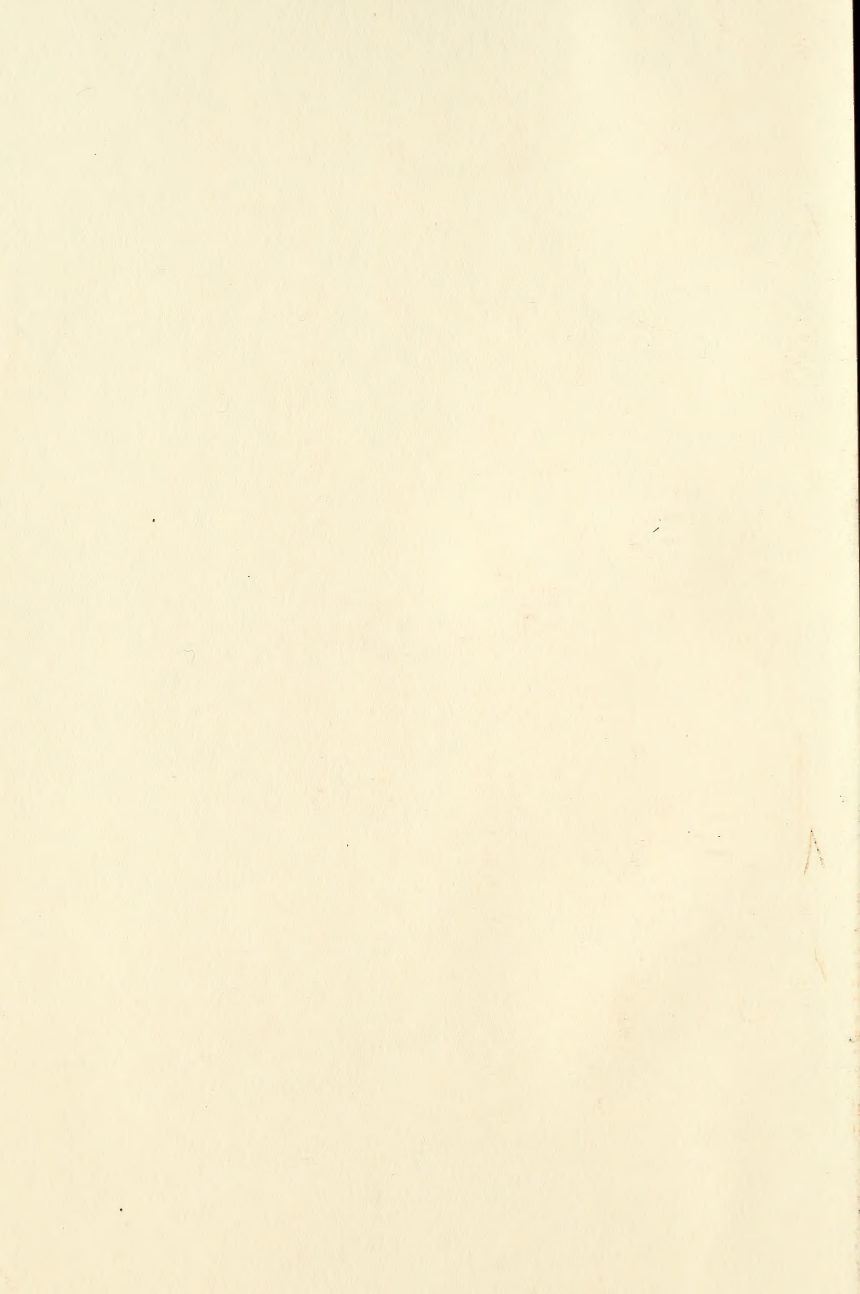




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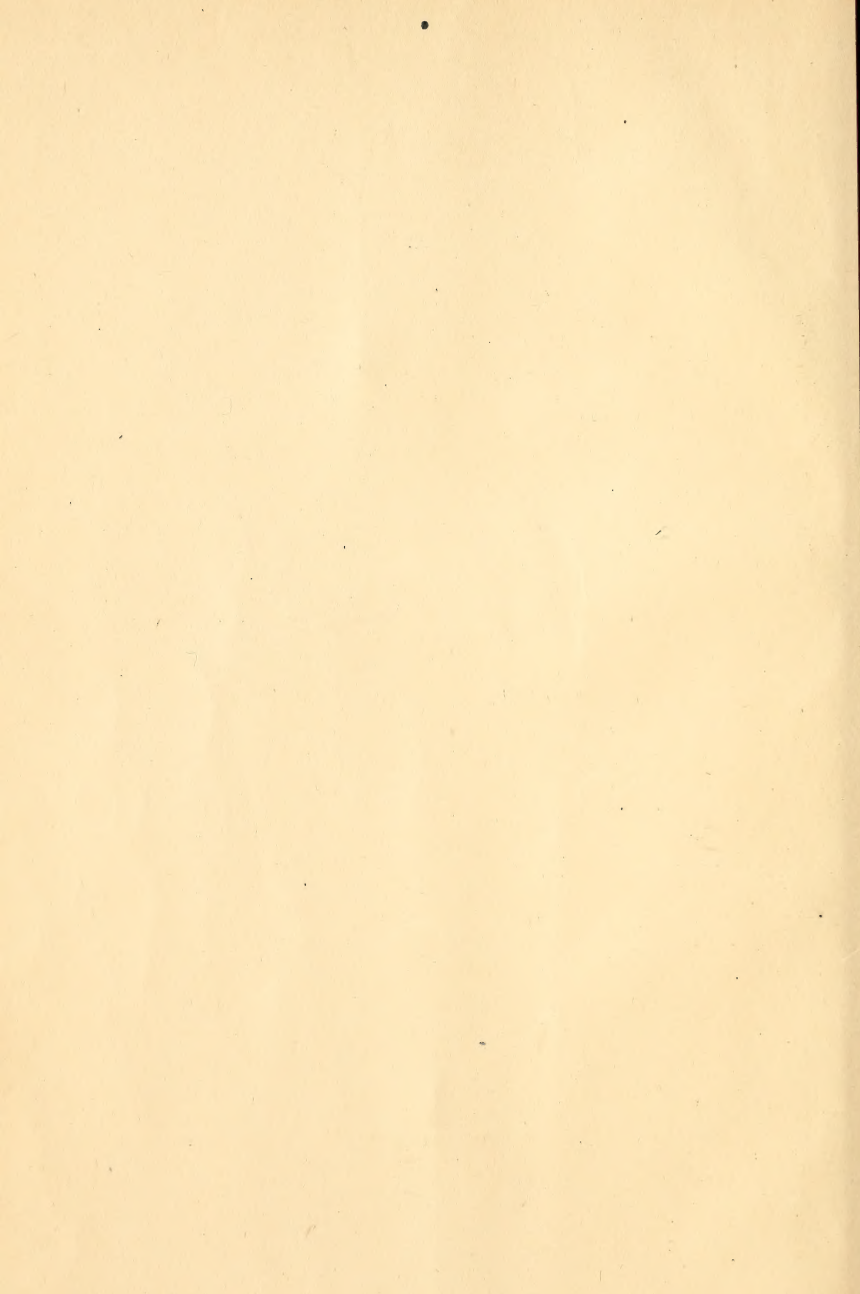


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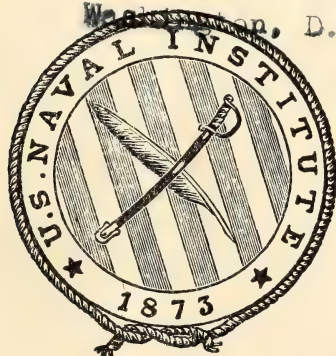




United States Naval Institute Proceedings

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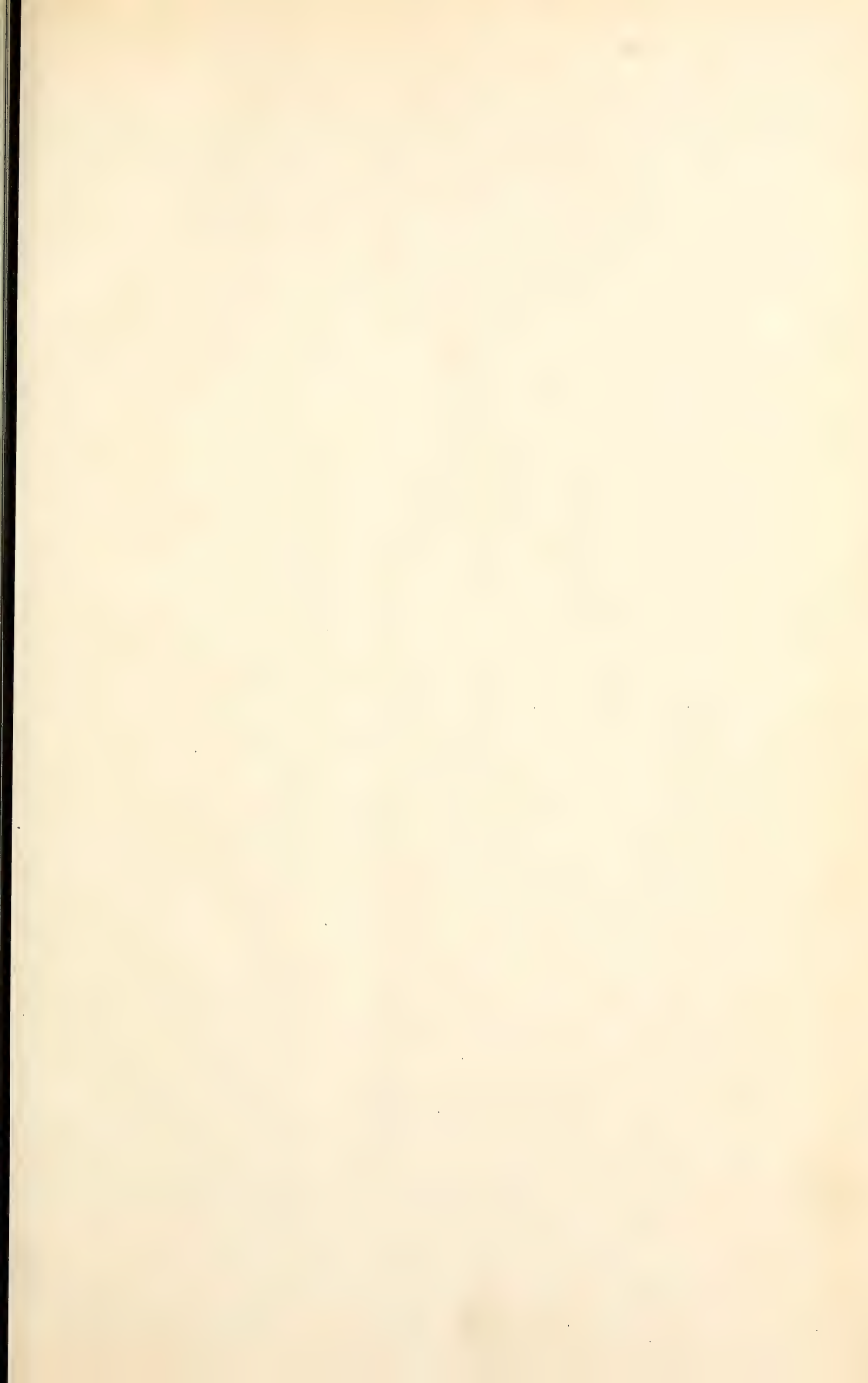
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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

A MIDSHIPMAN ON THE *MAINE*

By COMMANDER W. T. CLUVERIUS, U. S. Navy

FOREWORD

This is a midshipman's story of the ill-fated *Maine*. It was written on the Santiago Blockade during the Spanish-American War and only a few months after the ship's destruction. His record has come to light from the bottom of a chest of old papers and he wrote as he felt, while the scenes were yet fresh in his mind's eye. The good ship and her stalwart crew have never been forgotten in the navy even though the twentieth anniversary of that dread night is now at hand.

The North Atlantic fleet had arrived at anchor off Dry Tortugas on a delightful January evening, when the commanding officer of the battleship *Maine* received orders to proceed with his command to the city of Havana.

At last, after a month of false alarms and tiresome lingerings in southern waters, an American warship was starting for Cuba.

Some of us aboard considered it our good fortune, and others, while glad of the change, felt many misgivings within. We had been waiting since October, when, with hurry-up orders, we were sent to Port Royal, in South Carolina; then, after six weeks, a change of orders took us to the Norfolk Yard for Thanksgiving; and, finally, we hastened to Key West, there to remain until the fleet came South, whiling away the time in pursuit of filibusters and mosquitoes—both giving us much trouble.

Howbeit, January 25 dawned "clear and pleasant," and on the starboard bow stretched the deep blue line of the Cuban coast.

Steaming very slowly, every preparation was made for any possible emergency. The question was: Had or had not the consul-general asked for a warship?

The main and secondary batteries were supplied with ammunition, the guns themselves carefully examined and put in the best shape; rifles were brought from the armory, rifle belts filled with cartridges; the necessities for a landing force gotten in readiness. When still well outside the Morro, we went to general quarters.

American vessels were not usually taken unawares. We approached from the westward, the pilot boarded us, and slowly the good ship *Maine* entered the narrow channel—the first naval vessel to do so since the outbreak of the prevailing struggle for Cuban freedom.

On the starboard hand, La Punta battery displayed its antique artillery, and beyond towered the Castillo de Principe. On the port hand was the Morro, imposing in its ancientness, built up from the jagged rock on whose extremity stands the lighthouse which marks the entrance. Far up on the battlements floated the yellow and red of Spain. On past the Morro, along the heights, stood the fortress of Cabañas, the lodgment of those Americans who had persisted in the art of filibustering and whose efforts had not met with success at Spanish hands. Just below Cabañas, on the hillside, was the laurel grove where doomed insurgents were shot; and further down, on the water's edge, was the town of the Casa Blanca, where colliers were being unloaded from piers.

Passing by the large German frigate *Gneisenau*, lying at anchor, the *Maine* arrived, without event, at the mooring buoy designated by the captain of the port. This was a government buoy—No. 3—placed just off the Machina de San Ferdinand, the naval station. At another one of the buoys, the next to the northward, lay the *Alfonso XII*, a cruiser, the flagship of Rear Admiral Manterola.

At 10, the port was saluted and Cabañas returned the salute. Then we saluted the Spanish admiral and the *Alfonso* answered. A boarding officer shortly afterwards made the usual visit to us. Crowds of people lined the wharves along the entire city front, house tops were full, and the boatmen were doing the best business of the season.

Spaniards and Cubans are not naturally quiet, and the noise of the jabbering—the term seems justifiable—was plainly heard on our quarter-deck. The harbor was crowded with vessels. Across the way, off Regla, were the liners taking cargo from lighters; up

the harbor a bit were two or three small gunboats. Near Casa Blanca was moored the large dry-dock brought from England.

At the docks were the transports loading with troops for other points on the island.

No doubt the coming of the *Maine* had created a stir and set all the tongues of the populace going.

"So that's the best ship in the Yankee navy!" said one sneeringly.

"Why," remarked another of the loyal worthies on the docks, "put her on the quarter-deck of the *Carlos V* and you couldn't find her."

"If the *Palayo* ever got after her!" exclaimed a third. The Cubans, though, felt proud of the arrival of the *Maine* and took the meaning of it to themselves.

An officer was sent to call on General Lee reporting the arrival and, also, that the salutes had been exchanged and the official visits made.

I chanced to be the one sent to the consulate, and was put ashore at the Machina. At the gates to the street were throngs of people peering through at the American boat. Followed by a crowd of urchins and idlers I reached the Casa Nueva, in which are located both our own and the British consulates. The general received me and seemed much surprised at our early arrival. I could see that he did not expect a ship—at least, not just then.

"Was there any disturbance on your way in?" he asked. "None," said I. Again he looked surprised, and arranging the hour for Captain Sigsbee's visit I withdrew. With the same band of followers, augmented, perhaps, by a few more negroes, my *cabriolé* soon reached the Machina where the boat awaited me.

Not until after all the official visits were made, were the officers allowed to go ashore. Captain Sigsbee and his aid, Midshipman Holden, called on the admiral at his residence in the Machina; then on the acting captain-general of the island, General Parrado. Blanco, at that time, was in the Province of Santa Clara attempting to buy over the Cuban leaders in the east.

General Parrado received the captain with much courtesy and promised to return the call next day. What with all these official obligations devolving upon Captain Sigsbee, it was some time before he found himself able to pay his respects to that august body of the Cuba-Española, the Autonomist Cabinet, whose dignity

was considerably ruffled when the American naval officer failed to do homage the very first hour of his arrival!

The second day in port, during the forenoon, General Lee—jovial as always—came on board with a party of Americans and Cubans, and a cordial greeting followed. The next day, General Parrado and staff arrived alongside in the official launch. They were received by the captain and officers, and the marine guard was paraded. General Lee accompanied the party, his civilian clothing forming a great contrast to the gaudy array of the Spanish staff-officers. Not one single uniform matched another. Some wore red coats, light blue trousers with green stripes; some, blue coats, red trousers with black stripes; others wore green coats, red trousers with blue stripes—for all the world like the "soldiers-so-brave" in the comic opera of the period.

The acting captain-general, seemingly a very able man, inspected the ship from top to bottom. Some of his officers looked rather dubious, when, at the entrance of the long armor-passage, we desired them to pass through.

There was no telling what those Americans would not do.

Parrado was much pleased with the *Maine* and expressed his satisfaction the following day by presenting the officers' messes with the best sherry his cellars contained.

Soon the visiting populace began to pour in upon us, from the early forenoon until dark every day. Large parties of Cubans—pretty girls, enthusiastic young men, scolding duennas, and crying children—crowded aboard. And all the while Spanish boatmen, struggling for the gangway, made such a hubbub, that the sentry's order to "move off" or "get out of that" was not heeded. These fellows would hang on to the boats at the booms, to the pendants, to the ash-chute, to ring-bolts anywhere to be able to keep from pulling one whit more than absolutely necessary. The bluejackets enjoyed it all hugely, and, as only one or two spoke Spanish, those acting as guides used the sign language mingled with sea-going terms and strong English expressions. A party would gather around one as he opened the breech of a six-inch gun. He would go through the acts of loading, training, and aiming, then the meaning would dawn on the audience and a "Si! Si! Si!" was passed around, and the entire party would put on a broad smile of admiration as the demonstrator took a fresh chew.

No visitors were allowed below the main-deck unless accompanied by one of the crew detailed by the officer of the deck. This rule was strictly enforced at all times. The chief master-at-arms, with his assistants and the marine sentries kept a constant patrol on the berth-deck and below. Now and then a Spanish officer was seen amongst the visitors, and sometimes a group of soldiers appeared; but they, poor unfortunates, did not know a turret from a capstan.

From time to time we saw the big transatlantic transports come in laden with raw troops, most of them mere boys. Then the city went wild, rockets fired, flags flying, ferry-boats leaving their route and circling around the steamers for hours, with brass bands hammering out "Cadiz" over and over, and the passengers yelling themselves hoarse with cries of "Viva Cuba-Española!—Viva La Autonomiste!" Later on the troops would be removed, some sent to the front at once, some to Cabañas, and others to the arsenal up the harbor.

Another German vessel arrived—the *Charlotte*—and anchored near by. Soon the French flagship *Dubordieu* came in and anchored near us, making a very pleasant neighbor.

Shore leave was granted the officers a few days after our arrival and we were ordered to wear civilians' dress ashore at all times. Popular feeling, we soon found, was decidedly against us and against the maintenance of an American warship in the harbor of Havana. The Cubans, whose acquaintance we had made on board, extended hospitalities, and regretted very much their inability to entertain us as they wished, through fear of the annoyances and friction this would cause with the authorities. In other words, to be seen publicly with an officer of the American navy, meant to be marked as an insurgent sympathizer.

Of course, we met many Cuban-Americans. The majority were delightful, polished persons. Others were American in name only, and had but little contact with our own people and our own customs. The greater bulk of the populace were Cubans. The Spanish troops—a very transient portion of the inhabitants—in and about the city were numbered by the thousands. There were officers everywhere.

The cabmen, the boatmen, the public servants, the hotel employees, and above all, the shopmen, were Spaniards. The Cubans we met were for the most part property owners, and, before the

war, maintained their large sugar estates, so lived in a certain amount of luxury. The effects of the war on their interests were, first, to compel them to pay a heavier tax to the Spanish Government; and, besides, to make a like compensation to the insurgents to be allowed to grind their own cane. Finally, the Cuban estates were closed entirely, many of them burned, so that the only plantations doing a profitable business in the Island of Cuba were those controlled by American interests.

The representative Cubans—I mean those upon whom the duties of governing free Cuba ought by right devolve—directly and indirectly helped the insurgent cause. There were members of the best families in arms throughout the island. Yet, I have heard many Cubans say—some of their best minds too—that annexation to the United States would be the only solution of the problem, the only means of securing the permanent welfare of the people at large.

These, our friends, while they rejoiced to see the *Maine* at anchor off the city, often told us that they were not entirely at ease as regards our safety in those waters. Spanish treachery to them was an every-day affair. They saw it in the every act of the Spaniard, and naturally apprehensions for our well-being arose.

The greatest element of disturbance in Havana society was the Spanish soldier. Should you chance to join that great throng of promenaders in the Parque Central, as the band played about the base of the statue of Isabella La Católica, your first thought would be—Where did all those Spanish officers come from? They outnumbered the civilians, and, in their comfortable colonial uniform, took possession of the promenade. One rarely saw a Cuban girl in these gatherings at that time.

The Spanish naval officer was more or less countenanced by the Cubans and was often received in their homes. Those I met were bright, courteous people. Yet even as the officers of the army were not obliged to remain with their troops in the various garrisons about the city, no more were the officers of the navy compelled to live altogether aboard ship. Their naval academy training profited them little, it seems, especially on the Cuban station. Drills and maneuvers were unknown; target practice, something they read of. Their vessels deteriorated because the funds for repairs never got as far as the ships themselves. In fact, the *Alfonso XII*, the flagship, had not been able to move

under her own steam for one year before the *Maine* came, because almost every boiler-tube had gone—rusted and useless.

Then the troops, a miserable lot of recruits they were, landed from a transport one day, sent to the front the next, marching back and forth, through swamps and morasses, living in filth, one meal a day out of a common trough, fallen upon suddenly by insurgent bands, finally brought back, burning up with fever, to hospitals, which the majority of them never left again. And yet few deserted to the enemy. Unquestionably, the Spanish soldier who fought the insurgents in Cuba deserves this much credit, that he remained loyal, despite unceasing cruelty and suffering which few would have endured.

There were several thousand volunteer troops in the city consisting of the shop-keepers, clerks, waiters, and loyal Cubans. Certain battalions were inspected each morning on the Prado. They carried their rifles as farmers would hay-rakes. An imposing spectacle they presented at dress-parade. The authorities had tried repeatedly to send them to the front. But they declared emphatically, one and all, that, primarily, they were the home guard. I noticed that their posts were principally in charge of the soup-houses for the *reconcentrados*; so, no doubt, they had a strong political pull.

The military police in the city were picked troops, and, as a rule, were very fair specimens of the soldier. There were also the civil police, with whom every cabman and street vender had the privilege of discussing any orders given them.

In all, then, Havana was in a state of unquiet when the *Maine* arrived on the scene. The government was doing all it could to draw the minds of the people from the war. Mazzantini—the greatest living matador—was engaged for seven *corridos* at the Plaza de Toro, across the harbor in Regla. He was paid \$30,000 for his endeavors to divert the distracted thoughts of the Havanese. Anonymous posters and incendiary circulars were scattered broadcast throughout the city. Some said the Autonomists were responsible for them. Several reached the *Maine*. One of them denounced the Yankee pigs in strongest terms; another upbraided the loyal citizens for tolerating the presence of an American warship in their beloved waters—could this be called Spain with honor?

The crowds returning on the ferry-boats from the bull fights would shout "Viva España," as they passed the *Maine*. In fact,

one brave boat load went so far as to cry out "Down with the Americans!"

The days went by rapidly. General Blanco returned to the city and Captain Sigsbee called—the call was not returned. We made excursions in and about the city, saw the troops coming and going, took bicycle tours through the suburban towns, down to Mariano Beach, out to the ball games at Védado. Yet, we never felt exactly at home. At the hotels, the Spanish and French officers were always shown preference. Often the cabmen would refuse to accept an American "fare." The French officers were tendered a large reception and ball; we were not invited. The greatest attention we received was shown us by the professional beggars and the *reconcentrados*—the latter fast developing into the former. In January, 29 of these unfortunates, driven into the city by both Spaniard and insurgent, died of starvation in the streets. That was the smallest number recorded in any one month. Since the outbreak of the war, the population of Cuba had been reduced 400,000—killed, died, or disappeared.

During the first week of February, Aranguren, a dashing insurgent leader, was betrayed, and a hundred Spanish troops were sent to take him. So they did—dead. From the consequent celebration and general jollification one would think that the insurrection had been quelled.

A few days later, a rumor was rife aboard ship that the *Maine* was to attend the carnival at New Orleans. The next day, we found that there were no orders to that effect. On the 12th, the *Dubordieu* left for the carnival, the Germans having sailed some time before. On the 13th, Sunday, a report was made of the rough drawing which had been discovered on the wall of a house in the city depicting the destruction of a battleship.

It has been mentioned above that the *Maine* was constantly prepared. The ordinary anchor-watch at night was supplemented by a regular quarter-watch, ready to jump to the guns at a moment's notice. Additional sentries were posted forward and aft, and, no boat, whether passing or coming alongside, escaped the challenge from our decks.

Tuesday, February 15, the last day of our good ship's life, arrived. It was a beautiful day, with a gentle northeast breeze blowing and the harbor full of craft. The coasting steamers at the docks, I remember, were getting cavalry troops on board, and as they were loaded, hauled out in the stream. I had the watch

from four to eight in the evening. Nothing of event occurred. I noticed that the wind had shifted to the northward, and the ship swung to that point; for we always rode head to wind there. Only once during our three weeks' stay had we headed in that direction.

At eight Lieutenant Blandin relieved me, as midshipmen stood the day watches only. The customary eight o'clock reports were made as usual; the night watch was mustered, ready to go on at nine o'clock. The men were dancing in the starboard gangway to an accordion's music. One of the gunners' mates was playing a mandolin in the after turret. We were accustomed to turning in early, and by nine o'clock when "pipe-down" went, several of the officers were already asleep. Many of us in the junior officers' quarters were getting letters ready for the morrow's mail. At three bells I was still writing, with but little clothing on—for it was very warm between decks.

The letter finished I was sealing it, when suddenly a report—the firing of a gun it seemed—startled me, followed at once as it was, by an indescribable roar, a terrific crash, intense darkness, and the deck giving away beneath. Out in the mess room, I groped my way, and found Bronson, a class-mate. "Come on," said he, "we'll make it," and in the passageway where the water was now ankle deep, we felt a draft of air from the forward end where once ship had been was now open to the sea. We made for the junior officers' hatch. We found it blocked by wreckage. One exit closed, though several near us were attempting to get up that way. Around the engine-room hatch, down which the water poured, we two picked our way aft, up what had been the ladder of the ward-room hatch, out through the cabin passageway and climbing the outside of the after superstructure found ourselves on the poop, safe. All the officers (save two) and a few of the men on watch, fortunately aft, had reached this, the only place of safety. The poor wretches, pinned down and drowning, mangled and torn, screamed in agony. A crew of officers and men jumped into the only boat left—the captain's gig—and pulled forward. The *Alfonso's* boats arrived, then came those from the Ward liner *City of Washington*, which had just come in from New York. The fire in the upheaved mass began to burn fiercely. Officers climbed forward on the debris, over the quarter-deck to lend assistance; they could do nothing there, everything had gone. The work of rescuing was progressing rapidly. One Spanish boat alone saved two-score men.

"Captain, we had better leave her," said Lieutenant Commander Wainwright, the executive officer, as the water washed the poop and the wreck sank deeper in the harbor ooze.

"Get into the boats, gentlemen," Captain Sigsbee said to us, quietly and sadly.

A muster of the survivors was made about a quarter after ten. Lieutenant Jenkins and Ensign Merritt were missing and more than 200 of the crew. Subsequent musters from the hospitals, from the vessels in the harbor, and from private houses throughout the city, up to the last recovery of a body, the latter part of March, showed that 260 lives had been sacrificed in a crew of 328 all told. Our wounded were given the best wards in the hospitals. Everything possible was done for them. Some lingered a few days in great suffering, many died the next morning.

The Spanish authorities took charge of the wreck at once, allowing no one near it. In the morning the *Mangrove* came in, followed by the *Fern*, two fleet tenders. That afternoon, the steamer *Olivette*, of the Plant line, took the survivors to Key West, with the exception of a few of the officers, detailed for duty with the wreck, who were to remain with Captain Sigsbee. We had contrived to get some clothing, for many of us had none. We then went to the Hotel Inglaterra, in which we made our quarters.

On Thursday, there was the public funeral of the bodies recovered at that time—only seventeen. It was a beautiful spectacle. First the marines, then the seaman battalion from the *Alfonso*. Behind them came the military, naval, and civil authorities; then, the long line of richly draped hearses. Following these, rode the officers of the *Maine* in carriages. Behind us marched the fire department in full force; then the civilians on foot; while hundreds of carriages brought up the rear. A sorrowful band we were, following our dead shipmates to their graves in foreign soil. For the Spaniards, however, it seemed, somehow, more of a gala-day festival. The streets were lined with spectators, and the police attended to duty so poorly, that the thoroughfares were often blocked.

The cemetery of Cristobal Colon is a beautiful spot outside the city, and there more than a hundred of the crew lie peaceful and undisturbed.

Our thoughts turned again to the wreck and next morning, Friday, Captain Sigsbee in one of the *Fern's* boats attempted to approach it; but the patrol boats would not allow this, as they

had other orders. This caused the delay of a day until we could be furnished with passes—the seal of the *Alfonso XII*. Permission was granted to hoist the American colors on the wreck; but as the order was not sent from headquarters, this also was not allowed by the officer in charge. Several hours were consumed in obtaining the order. The authorities would do anything for us—*mañana*.

The navy divers arrived from Key West and were idle at first. They must be accompanied in their work by Spanish divers, so said the authorities. Captain Sigsbee would not accede to this and an appeal to Washington changed the Spanish mind.

The next order that came from the palace stated that at least one Spanish diver must be present on the wreck when operations were going on, and that in no case was an American diver to go *outside* the ship. The claim of its being American territory was made at once. "*Inside*, yes, but not *outside*," replied the Spaniards. It took some time to have this changed from Washington and, finally, our divers went where they pleased.

Meanwhile, the wrecking outfit arrived. First came the *Right Arm*, then the *Merritt* with the big barge *Sharp*, and, finally, the derrick *Chief*. The work of rescuing bodies was the first consideration, and, as they were recovered, our devoted Chaplain Chidwick took charge of them. The court of inquiry arrived on the *Mangrove* and began its first session. The *Montgomery* came in and Captain Sigsbee took up his quarters on board. The *Bache* made frequent trips with the convalescent and took several bodies home for burial.

One morning when we reached the water-front, we found every craft in sight covered with flags and banners, and later, amid deafening noises of bands and bombs and the cheers from the thousands, the Spanish cruiser *Viscaya* entered the harbor from New York. She was followed, the next day, by her sister ship, the *Almirante Oquendo*. Rumors of war began to come in, yet the wrecking operations still went on. The court of inquiry left for Key West for a session and once more returned. After a time, Spanish authorities bethought them of a similar court, and very politely asked if their divers could go down. This was allowed them by the consul-general with the stipulation that they remain *outside* the wreck; for *inside*, they were informed, was *American* territory. There it stood. Nor did they ever go down within the wreck, and very little Spanish diving went on when the officer in

charge of it was not about. A large number of unexploded shell were recovered, several six pounders, and four of the 6-inch guns. There was not much else. The forward turret was never located; the after turret was on the bottom, still intact. The wrecking master and the dynamite expert showed that dynamite was absolutely necessary to recover the after 10-inch guns. The authorities were consulted. They were asked to allow the importation of 200 pounds of the explosive to be stored in their own keeping. This was not granted, the Spaniards claiming that their court of inquiry was not nearly through its work; and it was intimated that Captain Sigsbee wished to change the face of the wreck, and so destroy the evidences of an internal explosion. All knew what the conclusion of the Spanish court would be.

Internal explosion, indeed, when every sign, from the external pressure on exploded powder tanks to the double-bottom framing thrown up to the surface of the water, plainly indicated, that, whatever the cause had been, it was certainly foreign to the ship. Finally, our court completed its work and went home, while we awaited results.

The *Vizcaya* and the *Oquendo* sailed with secret orders. The Austrian cruiser *Donau* came in from New Orleans, and the Italian *Amerigo Vespucci* soon followed.

The newspaper men were getting nervous, rumor was rife, the Spaniards were uneasy. So were we. When would war be declared? was the question now.

"Of course we want war," said a Spanish army officer. "We know the result, still how can we lose Cuba more honorably?"

Americans were going home. Every outbound steamer was crowded. Cubans as well were leaving. Finally, a despatch ordered every officer home except Lieutenant Commander Wainwright. This was the 25th of March. Happy were we indeed—and I know Captain Sigsbee was glad to go, too, when the *Olivette* steamed out from the Morro and turned her nose northward across the Straits. How delicious was our first breath of fresh sea air after having been pent up so long in those filthy waters.

On April 6, the wrecking operations ceased and all concerned went home. The sequel is a well-known story, and as one contemplates the glorious victories of the American arms, ashore and afloat, one must surely feel that the lives of those seamen lost in Havana Harbor were not lost in vain.

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CAPTAIN WEIR'S AZIMUTH DIAGRAM

By LIEUTENANT E. R. McCLUNG, U. S. Navy

Captain Weir's azimuth diagram as furnished to ships bears an explanation of only one of the several solutions of the astronomical triangle which can be performed with more facility by using this diagram than by any other method. Directions for solving problems in addition to the usual one of simply finding the azimuth where latitude, declination and hour angle are known are here printed in condensed form, with a view to removing the page, and, after cutting it in two pieces, pasting these pieces on the blank margin of the diagram. Any doubt as to the theory and method involved in these solutions will be removed by consulting the references to Muir and U. S. NAVAL INSTITUTE PROCEEDINGS.

No explanation of the proper sign to choose is here attempted as this will be made clear only by practice. Therefore, it is well to solve a sample problem under each case, assuming the same values for all, so that the results will, themselves, be a check on the work.

The cases are numbered with reference to the case already explained on the diagram as Case I. The following small table offers a ready means of selecting the known and unknown quantities and should also be cut out and pasted on a blank space of the diagram. Subscripts *a* and *t* indicate arc and time respectively, and the quantity in parentheses is the one to be found by the solution.

Use as	Case I	Case II	Case IIIa	Case IIIb	Case IVa	Case IVb
Hour Angle . . .	<i>t</i>	<i>ta</i>	(<i>ta</i>)	<i>t</i>	$\lambda 2 - \lambda 1 t$	<i>Ct</i>
Latitude	<i>L</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>L</i> ₁	<i>L'</i>
Declination	<i>d</i>	(<i>h</i>)	<i>h</i>	(<i>d</i>)	<i>L</i> ₂	(<i>D</i>)
Azimuth	(<i>Z</i>)	<i>Zt</i>	<i>Zt</i>	<i>Z</i>	(<i>C</i>)	$\lambda 2 - \lambda 1$

DIRECTIONS FOR SOLVING ADDITIONAL PROBLEMS BY WEIR'S DIAGRAM

(See Muir, 1911, Appendix C, page 756, and U. S. NAVAL INSTITUTE PROCEEDINGS, December, 1908, page 1253.)

In all solutions reckon azimuth from elevated pole.

Case II.—Given L , d and t to find h and Z (to predict position of body, particularly a star). Find Z in usual manner by Case I, then convert Z into time and consider as an hour angle. Convert t into arc and consider as an azimuth. Use given latitude as latitude, and on declination scale read off true altitude, h .

Case III.—Given L , Z and h to find t and d (for star identification).

(a) Convert azimuth into time and consider as an hour angle. Use given latitude as latitude. Consider altitude as declination. On horizon circle read off body's H. A., expressed in arc and converted into time.

(b) Use known values of latitude, azimuth and hour angle as such and work backward to obtain declination.

Case IV.—(a) To find course to destination: Use latitude of place of departure as latitude. Consider difference of longitude converted into time as hour angle. Consider latitude of destination as declination, and on horizon circle read off Z —initial course required.

(b) To find distance to destination: Use latitude of place of departure as latitude. Consider difference of longitude as azimuth. Consider course converted into time as hour angle. Then on declination scale read off D , and distance to destination $= 90^\circ = D$. Reduce this value to minutes of arc = nautical miles.

The following hints will make the use of the diagram very easy and convenient:

Make a number of pins after this fashion



Place new numerals along horizon circle as follows:

From equator (90°) to south pole, add, in red ink, numerals from 90 to 180, at every fifth graduation opposite to black numerals running from 90 down to 0, thus:

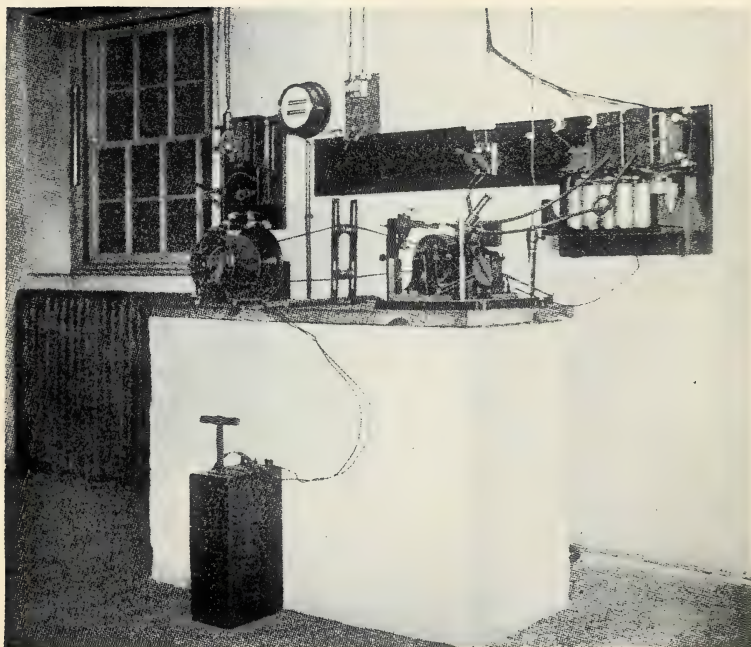
90°	....
85°	95°
80°	100°
75°	105°
etc.	etc.

From north pole to 105° and from south pole to 75°, place in black ink at each fifth division the value of hour angle equivalent to the degrees of arc, thus:

H. A.	Arc
0	0°
0:20	5°
0:40	10°
1:00	15°
1:20	20°
1:40	25°
2:00	30°
etc.	etc.

Each degree on the horizon scale being equal to four minutes of time, with these new numerals to aid the eye, time can be converted into arc, and the reverse operation performed, instantly.





METTEGANG RECORDER.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

A STUDY OF THE RATE OF DETONATION APPARATUS OF THE U. S. BUREAU OF MINES
(METTEGANG'S RECORDER)

By RUSSELL B. MUNROE

WITH SUPPLEMENTARY REPORT

By A. J. STRANE¹

At the Fifth International Congress of Applied Chemistry at Berlin, Dr. Mettegang described² a recording instrument of his invention for use in determining the rate of detonation in explosives. This instrument met with such approval that when, in 1908, the testing station of the Bureau of Mines at Pittsburgh was created, Dr. Holmes installed there one of Mettegang's recorders which has been in use ever since.

As the Mettegang recorder at Pittsburgh differs in details of construction from that described in the Reports of the Berlin Congress and in other publications, it may be well to preface this article with a description of the Pittsburgh instrument and its use, as given on pages 92 to 95 of Bulletin No. 15 of the Bureau of Mines.

Provided all other conditions remain the same, the shattering effect of an explosive varies with the velocity with which the explosion wave or explosive reaction travels through the charge of the explosive. In explosives fired by detonation this movement as measured in definite terms of time and length is styled the rate of detonation.

In every explosion, however initiated, the cross-sectional area that the exposed surface of the explosive immediately presents to the exciting cause or agent, is a most important factor in determining the final effect. In all of the tests of detonating explosives that have been made at the Pittsburgh testing station, mercuric fulminate, or a mixture of this substance with potassium chlorate alone or with other substances, has been

¹ Published by permission of the Director of the Bureau of Mines.

² Messung der Detonationsgeschwindigkeit von Sprengstoffen, Rept. of Berlin Congress, Vol. II, pp. 322-328, Berlin, 1904.

used in electric detonators as the exciting cause. To assure the exposure of a definite and uniform area of the explosive to the action of the electric detonator the explosive is placed in tubes of thin sheet iron, 42 inches (107 centimeters) in length and $1\frac{1}{2}$ or 2 inches (3.8 or 5.1 centimeters) in diameter. The variations in the diameter of the iron tubes used are permitted in order to meet the requirements of the different explosives to be tested and to allow for the different diameter of the cartridges in which they are furnished for use in blasting.

When the tube has been charged with the desired amount of the explosive to be tested, two copper wires are inserted through perforations in the tube and cartridge file, at a distance of 1 meter apart, so that the column of explosive between these wires is 1 meter long. The copper wires are each led to a recording chronograph. A No. 7 electric detonator is inserted in the tube, in one end of the column of explosive. The tube with its contents is then suspended in the firing chamber, the copper wires are connected up to the recording chronograph, and the electric detonator, which has been connected to a dynamo electric machine, is fired. Of the two copper wires passed through the tube, the one that is nearest the electric detonator is ruptured first. As the explosion wave proceeds through the column of explosive the second wire is eventually reached and ruptured. The time which elapses between the rupturing of the first and second wire measures the rate at which the detonation proceeds through the column of explosive.

The time which intervenes between the rupturing of the first wire by the explosion of the electric detonator and the rupturing of the second wire by the detonation of the last layer of explosive at 1 meter's distance from the first wire is measured by means of the Mettengang recorder shown in the plate given herewith.

The primary components of the Mettengang recorder are a soot-covered bronze drum so connected to an electric motor that it may be caused to revolve at any desired speed up to 105 revolutions per second; a 220-volt direct-current motor provided with a rheostat for controlling its speed; a vibration tachometer so connected to the bronze drum that the number of revolutions of the latter in unit of time are accurately measured for any speed between 50 and 105 revolutions per second; induction coils, the primaries of which receive their current from an electric-lighting circuit having a terminal pressure of 220 volts, and platinum terminals placed about .25 millimeter (.01 inch) from the surface of the rotating drum and in circuit with the secondaries of the induction coils, by means of which electric sparks are so projected against the surface of the drum as to disturb its sooty covering and produce tiny bright spots at the point of impact. These spots may be easily perceived by the aid of a microscope attached to the recorder.

The drum is 500 millimeter (19.69 inches) in circumference. The edge of this drum is provided with 500 teeth which may be made to engage an endless screw. A pointer attached to this screw passes over a dial reading to hundredths, thus indicating with great precision the distance intervening between the spots produced on the soot-covered surface of the drum. The

drum is provided with six platinum terminals held by an insulated arm that may be so moved as to bring the points within any desired distance from the drum. Each one of these points may be put in series with one of the secondaries of the induction coils, while the other end of the electric lead is grounded to the drum through the base which supports it. Only two of the platinum terminals are used in any single firing trial for the determination of the rate of detonation in a given explosive; the other four are held in reserve for future use.

In ascertaining by this method the rate at which detonation once initiated is transmitted through a column or file of an explosive, the electric current used as the medium for transmitting the record is divided into two parts by passing it through two equal lamp resistances each of which, at the Pittsburgh testing station, consists of a series of from 5 to 20 16-candle-power lamps. After independently traversing the cartridge file at the initial and final points, the two leads are jointly connected to one of the poles of the primary of the induction coil through which the current passes to the return conductor. The secondary of the induction coil is then connected by one pole to the two platinum terminals and by the other pole to the base supporting the drum as described. In the induction coil, as is well known, any change of tension in the primary coil sets up an induced current in the secondary coil, and this mutual induction between the coils results in the production of a higher potential difference at the terminals of the secondary coil, so that sparks of considerable length and intensity may be obtained. In the earlier part of the work at the Pittsburgh testing station circumstances were such that coils provided with iron cores were used, and all the data for rate of detonation test recorded in this bulletin were obtained with iron-cored coils. By a readjustment of the apparatus, induction coils without iron cores were made to give the desired kind of sparks, and such coils have been used in all subsequent tests made at the station.

The vibration tachometer, by which the speed of rotation of the drum is measured, is connected to an auxiliary shaft that engages the main shaft of the drum by gears, thus preventing any irregularity in recording the speed due to slipping. This tachometer measures the number of rotations of the drum, but, as the circumference of the drum is accurately known, the distance per second which any point on the periphery travels may easily be calculated. Hence, at the highest speed of 105 revolutions per second, the distance of travel is 52.5 meters (172.2 feet) per second. At 50 revolutions it is 25 meters (82 feet) per second. At 86 revolutions, the number commonly used in the tests at the station, it is 43 meters (141 feet) per second.

The distance between the spots impressed on the surface of the drum are, as has been previously intimated, accurately measured by means of the filar eyepiece and the endless screw, the spots being focused on the cross hairs of the eyepiece.

The iron tube containing the cartridge file is suspended in the chamber and the explosive is fired. This chamber is a circular pit that was formerly used as the well of a gasometer. In adapting the pit to its new use the top of the gasometer was cut off and placed at the bottom of the pit on a bed

of sawdust, and the space between the gasometer and masonry walls of the pit was filled with sawdust. The cover of the pit consists of heavy timbers framed together and overlain with 12 inches (30.5 centimeters) of concrete reinforced by six I-beams. Four straps extend over the top and down to eight "dead men" planted about 8 feet (2.44 meters) below the surface of the ground. The pit is 16 feet (4.88 meters) in diameter and 11 feet (3.35 meters) deep. A manhole in its cover provided an entrance to the interior.

METHOD OF CONDUCTING TEST

The rate of detonation is measured through a cartridge file 42 inches (107 centimeters) in length. In making a test the separate cartridges, having the paper cut from their ends to avoid the damping effect to its folds, are placed end to end in a sheet-iron tube 42 inches (107 centimeters) long and either $1\frac{1}{2}$ or 2 inches (3.8 or 5.1 centimeters) in diameter, depending upon the diameter of the cartridges used. Two copper wires leading from the Mettengang recorder are passed 1 meter (3.28 feet) apart through the cartridge file and firmly secured. The charge thus arranged is suspended horizontally in the pit and exploded by an electric detonator placed in one end of the cartridge file. The drum of the Mettengang recorder is rotated at the desired speed, and the electric detonator is fired by an electric firing device placed near the recorder. As the wires that pass through the cartridge files are broken, spots are formed on the drum, the distance between the spots at a constant speed of the drum being proportional to the time elapsing between the breaking of the wires. When the peripheral speed of the drum is 43 meters (141 feet) per second, the smallest time interval which it is possible to measure is $\frac{1}{4,300,000}$ part of a second, although with the distance between wires equal to 1 meter (3.28 feet) such refinement is not necessary.

All high explosives are tested in cartridges having a diameter of $1\frac{1}{4}$ inches (3.2 centimeters). If an explosive with this diameter fails to detonate completely, cartridges having a diameter of $1\frac{3}{4}$ inches (4.4 centimeters) are used. If an explosive should fail to detonate completely with $1\frac{3}{4}$ inch (4.4 centimeter) cartridges it is considered unsatisfactory and is not eligible for the permissible list.

If the explosive submitted for tests is not in cartridges of $1\frac{1}{4}$ inch (3.2 centimeter) diameter, it is repacked, care being taken that the specific gravity as determined in the physical examination has not been altered.

The rate of detonation, which is expressed in meters per second, is computed from the speed of the drum and the distance between the spark points, as illustrated in the following example:

In the test of Carbonite No. 1 on March 20, 1909, the speed of the drum was 43,000 millimeters per second and the distance between spark spots 12.63 millimeters. Therefore, 43,000 millimeters were traversed in one second, 1 millimeter in $\frac{1}{43,000}$ seconds, and 12.63 millimeters in $\frac{12.63}{43,000}$ seconds.

Hence, $\frac{12.63}{43,000}$ seconds is the detonation time for a 1-meter length of the

explosive, and one second is the detonation time for $\frac{43,000}{12.63}$ meters, or a 3405-meter length of the explosive.

THE TESTS

This study was undertaken to determine the maximum variation in the calibration of the Mettegang recorder and how best to reduce this variation to a minimum.

The machine was first put in adjustment. That is, all of the spark points were brought into line with regard to their distances from the drum, and the arm carrying them was adjusted so that their travel across the drum was parallel with its surface. To adjust the points, the drum was first coated with soot and one needle adjusted to just touch the drum, as indicated by a scratch produced in but not through the soot on the rotating drum. The arm carrying the points was then adjusted so that the point would just scratch the drum completely across its face when the arm was run back and forth. The other points were then screwed down until they just marked the drum when it was rotated. The graduation on the graduated screw controlling the vertical movement of the arm was noted and called the zero point. The points were then raised .22 millimeters and ten shots fired with the drum standing still (Table I).

TABLE I

Electric Detonator M. 1806 A. Spark Gap, .22 mm. R. P. S., 0

Trial	1	2	3	4	5	6	7	8	9	10	Aver.	Max. Var.
1-2...	3.92	3.64	3.90	4.31	4.12	3.84	3.70	3.78	3.83	3.55	3.86	.67
1-3...	4.06	3.84	4.04	3.97	4.12	4.00	3.83	4.14	4.03	3.87	3.99	.21
1-4...	4.15	3.77	4.04	4.15	4.19	4.14	3.98	4.05	4.03	3.71	4.02	.41
2-3...	.14	.20	.14	— .34	.00	.16	.13	.36	.20	.32	.13	.70
2-4...	.23	.13	.14	— .16	.07	.30	.28	.27	.19	.16	.16	.46
3-4...	.09	— .07	.00	.18	.07	.14	.15	— .09	— .01	— .16	.03	.34

After these 10 shots had been fired, two shots each were fired with the points .44, .66 and .88 millimeters from the drum. The variation in distance between the craters was not noted, but the effect of sparking distance upon the shape of the spark crater was observed.

A set of three readings was then made with the drum running 90 revolutions per second and a spark gap of .22 millimeters (Table II).

Another set of these readings was made with the .30-millimeter spark gap and the drum running 90 revolutions per second, but dynamite was used in the standard way to break the circuits (Table IX).

TABLE IX

E. D. 1806 A. Explosive D 1906 A. Gap, .30 mm. 90 R. P. S. Standard Method
(Circuit broken with dynamite)

Trial	1	2	3	4	5	6	7	8	9	10	Aver.	Max. Var.
1-2..	4.22	4.28	4.08	4.12	5.20	4.24	4.44	4.51	5.35	4.90	4.53	1.27
1-3..	4.34	4.31	4.15	4.26	5.02	4.78	4.64	4.26	4.99	4.69	4.54	.87
1-4..	4.16	4.20	4.10	4.14	4.80	4.40	4.25	4.70	4.45	3.91	4.31	.89
2-3..	.12	-.03	.07	.14	-.18	.54	.20	-.25	-.36	-.21	-.01	.56
2-4..	-.04	-.08	.02	.02	-.40	.16	-.19	.19	-.99	-.99	-.23	1.15
3-4..	-.18	-.11	-.05	-.12	-.22	-.38	-.39	.44	-.54	-.22	-.19	.98

CONCLUSIONS

As will be seen from the preceding tables, the distance of the spark point from the drum did not materially affect the readings. The only noticeable effect was that the percentage of misses increased as the spark gap increased.

The spark crater was not measurably affected in size or shape by the sparking distance. In the case of points one and three, it consisted of a group of spots in the form of a circular cluster approximately $\frac{3}{4}$ millimeter in diameter, while two and four were merely smudges with occasionally a bright spot in the center. This was so in all cases save where the iron core was used, when points one and three appeared as a line of spots.

In all cases when the drum was rotating the head spot was taken as the point to measure to, and when the drum was at rest the center of the cluster was used.

The iron cores did not seem to appreciably decrease the maximum variation, but did increase the percentage of misses. The sparks in this case are much more easily read.

The deficiency in the instrument seems to arise from two sources, the character of the spark crater and the method of breaking the circuit.

The first cannot well be remedied without impairing the accuracy or the simplicity of the instrument.

The coils could be so designed as to produce a single intense spark, but then this would be only produced at a critical sparking

distance. At greater distances no spark would mark the drum, and at best there would be a number of sparks as at present.

Should coils having a magnetic core be used, the period of sparking would be decreased so as to produce a line of sparks, the head of one of which could easily be read, but then the time lag of the coils would become an appreciable factor. All of the coils would have to be very accurately built, installed and calibrated, and even then would not be correct, as there is a slip connection in the sparking circuit between the coils and the drum, and this would have a varying resistance which would materially affect the accuracy, as the period, and hence the lag, is dependent to a considerable extent upon the resistance of the circuit.

The only other general type of coil is that producing an undamped spark such as is in use at present.

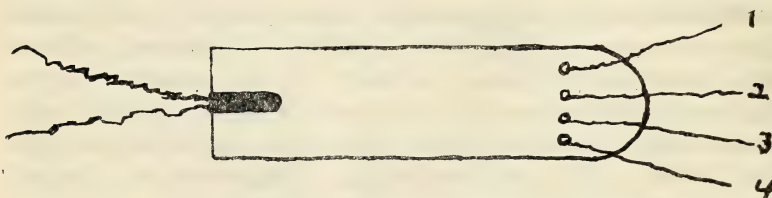
The question of spark coils does not appear to be as important as the method to be used in determining the zero of the instrument, or, more specifically, the method of breaking the wires. If the readings obtained by using a detonator are compared with those obtained using dynamite in the standard way, it will be seen that the maximum variation obtained using dynamite in the standard way is very large. I question whether using dynamite in the standard way is a fair one. It does not simulate the conditions obtained in a standard file in any way save that the wires pass through the explosive.

I cannot see why wires passed through the explosive should be broken with any uniformity. In the case of the file, the metal case tears the wires apart, and when they are properly kinked over the case uniform breaking may be expected. This is not the case with the single cartridge. In some cases the wires were found with the insulation stripped back for a considerable distance and the wires badly elongated, showing that an appreciable period had elapsed before the wires broke. Hence if the wires are of material having exactly the same physical constants, a variable enters.

It would seem that the detonator method is the fairest method, as here the wires are so arranged as to insure a fair degree of uniformity in breaking, and the rate of breaking is so high as to reduce its effect to a minimum. It would seem that this variation cannot be much reduced below .50 millimeter, under the present conditions, but the instrument should be read as close as possible so as not to increase this variation.

SUPPLEMENTARY REPORT

Previous to the tests by Russell B. Munroe, it was customary to calibrate the Mettengang recorder before each series of tests by breaking the wires when arranged thus:



$\frac{1}{4}$ x 8-INCH CARTRIDGE WITH DETONATOR.

and with the drum running and points .22 millimeter from it.

Since Munroe raised the question of the accuracy of this method of breaking, the wire tests have been conducted by placing the 8-inch \times $\frac{1}{4}$ -inch cartridge in a $1\frac{3}{4}$ -inch galvanized-iron tube and proceeding as before, but with the copper wires kinked on each side of the tube at the position where they passed through small holes in it.

Ten shots were fired in this manner with the spark points .22 millimeter from the rotating drum (Table X).

TABLE X

E. D. M. 1806 A. Explosive D., 2014 C. Gap, .22 mm. 90 R. P. S.

Trial	Distances Read Between Spark Points (millimeters)					
	No. 1-2	No. 1-3	No. 1-4	No. 2-3	No. 2-4	No. 3-4
1st	+4.22	+4.43	+4.43	+.21	+.21	.00
2d	+3.57	+3.70	+3.91	+.13	+.34	+.21
3d	+4.31	+3.95	+4.00	-.64	-.31	+.05
4th	+4.05	+4.16	+4.30	+.11	+.25	+.14
5th	+4.14	+3.88	+3.74	-.26	-.40	-.14
6th	+3.72	+4.14	+4.30	+.42	+.58	+.16
7th	+4.48	+5.40	+4.25	+.92	-.23	-1.15
8th	+3.97	+3.95	+4.75	-.02	+.78	+.80
9th	+3.95	+4.25	+4.18	+.30	+.23	-.07
10th	+4.74	+5.88	+5.11	+1.14	+.37	-.77
Average	+4.12	+4.37	+4.30	+.23	+.16	+.01
Max. Var.....	1.17	2.10	1.37	1.78	1.18	1.95

TABLE XI

Actual Corrections for Spark Points. Obtained by Lowering Arm so that Points Marked on the Soot

No. 1-2	No. 1-3	No. 1-4	No. 2-3	No. 2-4	No. 3-4
+4.16	+4.30	+4.35	+.14	+.19	+.05

TABLE XII

Variation of Average Recorded Distances from Actual Correction

No. 1-2	No. 1-3	No. 1-4	No. 2-3	No. 2-4	No. 3-4
-.04	+.07	-.05	+.09	-.03	-.04

TABLE XIII

Maximum Variation of Recorded Distances from the Actual Distances

No. 1-2	No. 1-3	No. 1-4	No. 2-3	No. 2-4	No. 3-4
-.59	+1.58	+.76	+1.00	±.59	-1.20

The actual distances between the platinum spark points in the direction of the rotation of the drum were laid off on the soot-covered drum by lowering the arm supporting the screws until the points scratched the soot as the arm was moved in a horizontal line (Table XI).

The following figures were calculated to show the variation between the actual correction for spark points (Table XI), and the recorded distances (Table X).

1	was more than 1.50 mm. in error.				
4	were " " 1.00 " " "				
9	" " " .75 " " "				
15	" " " .50 " " "				
28	" " " .25 " " "				
44	" " " .10 " " "				
50	" " " .05 " " "				
56	" " " .02 " " "				
4	" less " .03 " " "				

In no case was the average of the six corresponding distances more than .09 millimeter in error (Table XI).

CONCLUSIONS

From the results of these tests, as well as from those conducted by Munroe and from previous experience with the Mettegang recorder, the following conclusions are evident:

1. The recorded distance between any two spark points may be more than 1.50 millimeters in error in either direction (Table XIII).
2. The same result, with narrow limits of error (Table XII), may be obtained by lowering the spark points to mark the soot coat, as can be obtained by running a series of 10 shots with the drum rotating and breaking the wires with high explosive.
3. The degree of accuracy of reading the distances between the spark points is out of all proportion to the accuracy with which they are established (Table XIII).

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THE WAR CRUISES OF H. M. S. *KARLSRUHE*

EXTRACTS FROM MY WAR-DIARY

(CONCLUDED)

By LIEUTENANT AUST

Free translation by LIEUTENANT J. H. KLEIN, JR., U. S. Navy

PROFITABLE WORK

4 September.—The following night was very light and clear. For the first time since our separation on 6 August we heard from the *Kronprinz Wilhelm*. We heard her radio without, however, endeavoring to communicate with her, as we did not wish to give away our position. As we well knew, there were 11 English war-ships all around us, among them some of our old acquaintances of the West Indies. We therefore decided to be as still as a mouse, even though we preferred to have an hour of gossip with Lieutenant Thierfelder.

5 September.—On the night following we again heard much radio work. Among the many secret code messages between the English cruisers we heard the report that the steamer *Kap Trafalgar* had been transformed into an auxiliary cruiser for work on the South American coast, and that our gunboat *Eber* had entered Bahia under the commercial flag. Then the land station, Olinda, at Pernambuco, reported in Italian to an Italian passenger steamer these short but comprehensive sentences: "Germans before Paris; Russians in Lemberg; Turkey has declared war on the Allies."

The Germans before Paris! Then next morning at reveille there was a big hullabaloo in the ship. Soon we had forgotten all fears that had sprung up at the beginning of the war when the declarations of war followed like one blow after another. The small grains of truth contained in these few words dispelled all the lies which had reached us heretofore.

When we met the *Asuncion* that afternoon she told us that the *Kronprinz Wilhelm* had spent the entire day of 3 September taking provisions from her. We must have passed each other at no great distance. Thierfelder had left a letter for the captain in which he reported his operations up to that time. Although we were very sorry not to have seen him, we were pleased to know that he was as well off as we were and that he lacked nothing.

6-8 September.—After the *Asuncion* had transferred the *Strathroy's* crew to the *Krefeld*, the *Karlsruhe* hurried to the calm place where the *Strathroy* waited for us with her cargo of coal. The coaling lasted until 8 September.

The glowing heat made the coaling a very hard task. The entire crew worked during daylight. During the night the crew was divided into two watches, which relieved each other every four hours.

These days were the most dangerous, perhaps the only dangerous, ones we had. In the open sea it was not so easy to surprise us. Steam was kept up to the highest pressure so that the engines were always ready for full power. Of course the guns and torpedo-tubes were always kept ready for action.

But all this changed as soon as we took the steamer alongside in order to get coal out of her. Readiness for action was seriously interfered with. Should an enemy appear the ships would first have to get clear of each other. Then we would have to get rid of the coal that was piled all over the deck and thus prevented the service at the guns. In any event much time would be lost before the ship could have been properly cleared for action.

This loss of time might be the deciding factor against us if an enemy ship should approach our coaling place by night or in inclement weather, such as we often suffered, especially in the early morning.

At night all unnecessary lights were doused. On the sea side the ships were entirely darkened. Low-powered lights burned only in the cargo holds of the steamer and at the most important places on the *Karlsruhe*. On such days the lookouts were doubled and only responsible men detailed for this duty.

9 September.—After filling up with coal we again set out to waylay ships. We took *Krefeld* and *Rio Negro* along; one formed our eastern scouting face, the other the western.

10-13 September.—In order to use as little coal as possible, that is, in order to reduce the dangerous coaling days to a minimum, the captain stopped the ship.

As long as no steamer appeared to give us work and diversion the time passed slowly and monotonously. Several hours were devoted daily to drills, usually "general quarters." In the leisure hours shark fishing was the best sport. The sharks on the high seas are smaller than the giant fishes that inhabit the waters along the Mexican gulf coast. They are hardly two meters long. It is surprising how quickly these beasts will appear if there is anything to be had. A short time after the ship stopped they swarmed around under our stern. As soon as they showed themselves the shark hooks were put over and some of them were soon caught.

The shark-shooters, however, had more success than the fishers. Several officers on the bridge or on the quarter deck shot the sharks whenever, in their eagerness, they showed their heads above water trying to grab the hunks of meat that were suspended close to the surface. Several of the robbers were sent back to the deep with battered heads or shattered spines.

Every time that the ship stopped for a time to transfer provisions, etc., from a captured steamer, a school of sharks soon gathered near our stern. Soon the rifles were busy cracking away at them.

14 September.—We were beginning to grow impatient because no smoke clouds came in sight. During the night of 14 September the engines suddenly went ahead from "Stop" to a high speed. We hurried to the bridge and saw the lights of a steamer ahead of us. The captain waited until the gray of morning and then set out for her. Her patriotic colors on her smoke-pipe were very pleasing to us: "Black, white, red"; much more pleasing than the English flag which she soon hoisted. As she paid no attention to our polite flag signal but kept going ahead undisturbed, we had to make our meaning plain by firing a blank shot. That worked at once.

The steamer was the *Highland Hope* of the Nelson Line. She was heading for Argentina to take a cargo of cold-storage meat to England. For this purpose she had been fitted out with a brand new cold-storage plant. In order not to delay her return to England she had been amply provisioned and coaled beforehand so that she would not have to stop to do this before starting back.

In addition to all these useful presents the Englishman brought us a complete file of English newspapers. These included even the illustrated papers. We saw, for the first time, pictures of the war. You can imagine how eagerly we all pounced on them as soon as the prize officer sent them aboard. In a very short time they disappeared in the mess rooms, officers' rooms and the men's quarters. As the newspapers contained some news items which would be of service in our operations (as, for instance, the steamer schedules, the arrival of strange warships in the various harbors, etc.), the captain ordered the prize officer to be sure that hereafter all the newspapers were sent to the bridge. It was very funny to see how one after another stole into the chart house to get a peep at the papers. The captain himself would get so interested in the news that it was hard to drag him away from them to dictate the answers that were to be signalled to the prize officer who sat over there impatiently swearing that he would not "find" any newspapers on the next steamer. But he did it just the same and the same proceeding would be repeated, everybody on the bridge quickly interesting himself in the newspapers.

The articles were neither easy nor good to read. Only after much labor could we wade through all the thick lies and finally reach a few words of truth and, in spite of all the twisted and hidden meanings, arrive at a picture of the approximate condition of affairs in Europe. We knew what value to place on the lies. After our experiences in San Juan and Wilemstad we did not expect much else. It was more difficult to understand the hate which was attached to everything German. Even the better papers, like the *Illustrated London News*, made no secret of this. None of us expected this attitude from a nation that prided itself throughout the world on its position and associations. In the middle of this slander were the Kaiser and the Crown Prince. Of the generals, General von Kluck seemed to have drawn most of the British hate. Hair-raising stories were told of him. From this we gathered that he had been the most successful general in the west, and, as we later discovered, we were correct. After Kluck came all the other generals, the other officers and then the entire army with their atrocities. And these papers were distributed throughout the world on thousands of steamers!

In our anger we cast the yellow sheets aside, only to get them back again shortly after, because they were the sources of our only reports.

The captain undertook to clip and paste the worst lies and slanders. In this way he gathered a thick folio. He called it "The Gathering of Lies."

Up to this time we had had the luck to meet nothing but English steamers, even though this main artery of commerce was used by many neutral steamers. While we were going through the regular work of transferring the crew to the *Krefeld*, taking over the radio apparatus, provisions, etc., a larger steamer was sighted which, from her radio conversation, we knew to be the Spanish steamer *Reina Victoria Elena* of the Compania Maritima of Barcelona. The reports from the radio rooms were substantiated by the outward appearance of the vessel and the Spanish mail flag which she flew, so that the captain decided not to search her. When she came in sight she asked, by radio, for our name and would not keep quiet. As her ceaseless questioning finally grew tiresome, the captain sent her the answer, "Convoying British ships." Even though we gave this answer as weakly as possible, an English ship, in our immediate neighborhood, could not help but pick it up. Of course, she immediately questioned the Spaniard concerning the remarkable "convoy" of which she knew nothing. But the Spaniard would not answer her. Instead the Spaniard asked her name, which she gave in such an indistinct manner that we could not make it out. The Spaniard then gave the Englishman her position.

This incident was rather unfortunate for us. Until that time we had been lucky enough to conceal the scene of our operations. And now, because of this accident, everything might be ruined.

The captain decided to leave the commercial route to Europe for a while and to go instead to the route to North America in order to try his luck. *Highland Hope* was blown up. Then the *Karlsruhe* with her two attendant steamers headed westward.

15 September.—We arrived in the track of the sailing ships. Since the beginning of the war we had not as yet run across a sailing vessel. On this day we met two. The first was a three-masted, full-rigged ship flying the Norwegian flag. A large sailing vessel under full sail is a beautiful sight, especially in the trade-wind region where the sun shines from a cloudless sky down on the azure blue ocean. The ship hove to at our order. She was the *Sorfareren* of Christiansand. She came from New Caledonia and was carrying a cargo of chromium for a Nurenberg firm to

Gothenburg. Therefore the captain was treated very politely. We were so fortunately situated that we could present him with half of a freshly slaughtered sheep and some new potatoes, which caused the captain no end of wonderment. He received this most gratefully and acknowledged our flag signal, "Pleasant voyage," with the same wish.

The second sail hove in sight that afternoon. She was a three-masted bark, apparently also a Norwegian. The captain decided not to stop her.

During the last eight days we had captured only one steamer. We now had to plan on filling up our bunkers. The coal supply was never permitted to fall below a certain amount, because we had to be ready for almost anything, such as meeting enemy war-ships and being pursued for a long time.

17 September.—We were rather downcast over our bad luck in having to leave the main commercial lane when our lookout reported: "Smoke, four points on port bow," and the ship immediately livened up. Eight bells had just been struck. The steamer—it was a steamer—fell, so as to speak, in the middle of our soup at dinner.

Of course the mastheads appeared over the horizon first. Very quickly thereafter came the smoke-pipe. And then, for a long time nothing more showed up, the smoke-pipe growing longer and longer. Mirages are rare in these waters. Therefore the steamer must have an especially long funnel. And this was the case as we soon discovered. Even when at a great distance away she hoisted the English flag.

Indrani was the name of our new acquaintance. Her home port was Liverpool. She seemed to be new and in excellent condition. The officers in their clean white tropical uniforms stood around on the bridge, where we also noted some especially fine and comfortable Madeira chairs. The Chinese crew were dressed in freshly washed, light-blue garments. We hoped that this ship would be laden with general merchandise. All eyes were glued on the signal flags of the prize-quartermaster. Then he signalled: "6700 tons Pocahontas coal from Norfolk to Rio de Janeiro." It seemed as if the English actually knew that we were on our way to replenish our coal supply! Our joy was all the greater because this was so unexpected.

The *Indrani* had all the conveniences of the *Strathroy*, and, in addition, was fitted with a radio. She would, therefore, make an excellent collier for us. It did not take long to make the change in her. Except one machinist who did not mind serving us, which service we gratefully accepted, the rest of the English wandered over to the *Krefeld*; the first officer of the *Rio Negro*, Jalaes, took command of the *Indrani*; Ensign of Reserves Hentschel, two petty officers and four seamen went aboard as the military crew, and the work was finished.

The English captain of the *Indrani* was favorably disposed. When the prize officer received orders from our captain to pass the word to our captured crews he always preferred to go to this captain. He seemed to take precedence over the other captains. Of course, the captured crews were not allowed to have any weapons. But the *Indrani* captain had a shotgun to which he was attached. He therefore requested permission to keep it. It was kept for him on the *Karlsruhe* and returned to him when he left. He was very thankful to our captain for this favor.

The *Indrani* had North American newspapers. They were better than the English, in that instead of the low-down hatred they catered to harmless sensationalism. Of course, they did not lie any less because of this. Much fun was caused by an article in which were described the extensive orders issued by the English Admiralty in regard to finishing the *Karlsruhe*. The ships sent out from England were not to return until our beautiful ship had been sunk. We were not a little pleased to note that we had become obnoxious to the British! In the beginning we often read in the newspapers about our wonderful adventures. In San Juan de Porto Rico we were described as "captured," later on (in any English newspaper) we were "sunk," then again we were only "disabled," and now we again seemed to be hale and hearty, so much so that all the ships that surrounded us—and we knew from their radio calls that there were not less than 22!—were unable to "disable" us. For this purpose four more armored cruisers were sent out. How did we escape them!

The *Indrani* was left behind with the *Rio Negro* and the *Krefeld*. We set out with the *Asuncion* to coal, in much better humor than we were in during the forenoon.

18-19 September.—Protected by a heavy fog we began this coal-ing. It lasted one day and one night. The next day was a day of

rest for the exhausted crew. Then we headed for our old place north of the Island Fernando Noronha and lay in wait.

20 September.—On the way there we paid a short visit to the *Indrani* and *Krefeld* in order to find out how our English wards were getting along. They had been behaving perfectly. We took the *Krefeld* and *Rio Negro* with us, leaving the *Indrani* behind.

21 September.—We did not have to wait long. On the first morning after our arrival the cheerful report of the lookout told of the approach of a steamer.

We hardly had to move out of our tracks. The steamer headed exactly for us. When she had arrived near enough so that we could make out her flag we suffered a slight disappointment; she flew the colors of Holland. She was the *Maria*, old and rather neglected looking, and was loaded down.

The signal from our prize officer changed our disappointment to joy. The *Maria* was under the charter of a London firm, carrying wheat from Portland (Oregon) to Belfast and Dublin. Ship and cargo were therefore confiscated and liable to destruction.

We figured out that this cargo was sufficient to provide bread for the entire population of London for 14 days, and so we thought: "Whoever digs a grave for somebody else is likely to fall in it himself!"

While the crew of the prize was being transferred and the explosives were being made ready, a second steamer on a southerly course hove in sight to the westward. The *Krefeld* remained with the *Maria* in order to pick up our men after the explosion and to wait for the steamer to sink. The soft-hearted English captains had begged our captain not to send them away again when a steamer was about to be sunk. They also wanted to see this scene! The captain granted their wish.

The *Karlsruhe* then hurried away to attend to the latest arrival. The pipes of the boatswain's mates on watch blew all over the ship: "The reserve prize crew be ready to leave the ship!" Good enough! We certainly had our hands full!

Even at a great distance we could, by means of the telescope, make out in the clear atmosphere the red English commercial flag.

The steamer was the *Cornish City*. Her home port was Bideford. She was bound to Rio de Janeiro with 6400 tons of Cardiff coal for the English Brazilian Coal Co. We were especially pleased with this, because several hours previously the captain of the *Maria*

had told us that the English cruiser *Glasgow*, loaded down with coal, had left *Rio de Janeiro* in order to chase the *Kronprinz Wilhelm*, and that the coal company was now short of coal. The coal we had captured was evidently consigned to the English company that had supplied their cruiser.

The *Cornish City* was an old steamer that had seen much service. We did not have the necessary men to convert her into another collier. As we were well supplied with coal for the present the captain decided to sink this prize.

About half the crew were English, the other half Chinese. They were transferred to the *Rio Negro* that had followed us.

Then the steamer was bombed. She filled rapidly and sank.

The *Krefeld* arrived just in time to witness the sinking.

A very successful day lay behind us. But before the *Cornish City* sank we heard strong radio messages being sent by the English steamer *Amazon*. This was a large passenger steamer of the English Royal Mail S. P. Co. If we captured her this would crown the day. The excitement was intense while the increased lookouts searched the horizon.

Meantime it grew dark. About 10.00 p. m. the lights of a steamer were seen to the eastward. Of course we all had hopes that this was the *Amazon*, and so we gayly pounced on her. As the captain expected to find many neutral passengers on her he decided not to hold her up until daylight.

The night was thick. Heavy rain and squalls passed over us all night. Several times we lost sight of the light.

22 September.—The breaking day brought us a sad disappointment. Ahead of us rolled a small ship heading north. On closer approach she, in order to increase our anger, hoisted the Italian flag.

The steamer was the *Ascaro* of Genoa. She was carrying corn from Rosario to St. Vincent (Cape Verde). Like most steamers of that nation she looked dirty and very neglected. When the prize officer returned from his work he seemed weak in the stomach from the terrible odors that pervaded the steamer.

Her papers were absolutely clear, so we had to respectfully permit her to continue on her way.

But we soon received our reward for the tomfoolery that the Italian had perpetrated on us. While the prize crew was going over to the Italian, a second steamer hove in sight to the north-

westward. She hoisted her flag at once, which we immediately recognized as a beautiful, large and new Union Jack. The Britisher had mistaken us for a friendly cruiser and could not imagine why we were hurrying to meet her. She then hoisted an enormous flag at the masthead so that we could see her better. But soon she seemed to smell a mouse; the red cloth was quickly hauled down and was never sighted again.

The case of this steamer was similar to that of most of the others. They never suspected anything as we steamed toward them, always thinking we were a British cruiser. What else could they meet on the free ocean except warships of the sea-ruling Britannia? They never thought of meeting a German man-o'-war until they saw us hoist our war flag. Later on, however, when the press reports showed that many steamers were disappearing, the English captains seemed to get an inkling of the true state of affairs. After that we occasionally held up a steamer and found that the men had already packed up their clothes and had cleared away the boats ready for lowering.

About 6.40 a. m. we captured the steamer *Rio Ignassa* from London. She was carrying 4800 tons of coal from Newcastle to Rio de Janeiro. The crew consisted entirely of Englishmen.

She was sentenced to be sunk for the same reason that the *Cornish City* was sunk.

While we were doing this a steamer came in sight heading straight for the *Karlsruhe*. When ordered by flag signal she came close aboard and stopped. She carried the Swedish flag, was named *Princess Ingeborg* (Axel Johnson and Co., of Stockholm), was loaded with merchandise and passengers, among them several German ladies and children, and was heading for South America. Her papers were quickly examined and she was then released.

The captain first decided to fill up our bunkers before sinking the prize. But this was given up because of the heavy sea. The English captain assured us that he did not have very good coal and that we would surely soon meet other steamers that would bring us better fuel. This agreed with our own expectations.

The *Rio Ignassa* was bombed in two places, namely, in the shaft-alley and forward in the "collision room." She sank rapidly, heeling over at the finish. This was the first steamer we saw sink in the daytime. Shortly before she heeled over one of her flags broke out and it was the letter "Q" which means: "I wish to

signal you." Of course nobody had remained on board. It was another trick of the bogey man.

This steamer also brought many newspapers. In one of the illustrated papers was a good picture of the sinking of the *Mainz*. The ship, about half sunk, continued to fire her guns at her more powerful and more numerous foes. The picture was pasted up in the men's quarters and the necessary remarks added to it.

The press reports that concerned us were now being translated and made up into a sort of ship-newspaper which was distributed among the men.

PAUSE!

23-27 September.—Since leaving the home country the *Karlsruhe* had, barring a few short stops, been underway constantly. The boilers and engines can be called the heart of the ship. In order to keep her well and strong these must be overhauled from time to time.

As all the English warships were, to all appearances, a good distance away, we decided to use several days for this purpose. A surprise by an enemy cruiser would have been fatal to us at such a time because the engines were not ready. In order to prevent a surprise we proceeded a good distance to the westward out of the commercial highway.

The other ships also needed repairs and so they used these days for the same purpose. The ship was pretty badly damaged by the constant coaling. The paint on the side had been worn away and the rust showed through in many places. Very little of the deck linoleum remained. The bare steel came through all over. The first officer did his best to remedy these conditions.

Other than this, these days were much like the days when we lay in wait without sighting anything.

The shark hooks were broken out. The officers amused themselves shooting sharks. During spare hours we hunted places free of coal dust in order to sleep or read.

The best gathering place was still the navigating bridge which was always clean.

As long as the quarter-deck and the remainder of the main-deck was covered with a deck-load of coal there remained only the poop to go to in order to get some fresh air, but even this was no good when the wind blew the coal dust around. As soon as the coal on the quarter-deck was passed down to the bunkers the after

end of the main-deck was thoroughly scrubbed down. Then we had a place "to promenade" and "to Müller" [evidently the Müller physical exercises], of which we were all in need. The captain also enthusiastically joined us in these physical exercises.

After the evening meal the men would gather on the foc's'le, the officers on the bridge, and listen to the music. Our ship's band was gathered after much work before the ship left home. Their performances were better than those of other ships' bands, barring the regularly organized government bands.

Every Sunday the captain held a short service on the quarter-deck. The band then played on the after-deck. Refreshments and cigarettes were also served to the men.

The steamers accompanying us were always invited to these concerts. On the *Krefeld* several hundred Englishmen, Frenchmen, Chinese, negroes, etc., would crowd the rail on the side toward us, all listening to the strains of "Deutschland, Deutschland, über Alles" and the "Watch on the Rhine," which were always sung as a finale. The repertoire of our band was very extensive. The latest opera hits were played as readily as the oldest Prussian ballads.

One day our men got up a real minstrel show on the foc's'le. There were plenty of comedians among them. Their efforts were rewarded by heavy salvos of laughter. One of the mates discovered that he possessed poetical talent, and one day he showed this to an astonished but thankful audience.

And day after day the wonderful sun continued to shine down upon the endless, deep-blue surface as if there were nothing more peaceful than this poor earth. It is a pleasant feeling to wake up in the morning and know that the sun is shining!

The captain would invite several of us to dine with him nearly every evening at dinner, and on Sunday to lunch. Of course, the conversation soon got around to the political situation at home, and from that it was not much of a jump to our relatives. Nobody knew anything definite about his own. The last letters were written at the end of June. This one had a father, that one a brother or brother-in-law in the field. But no one knew on which front they were serving. The captain always drank a toast to the welfare of our loved ones at home.

OUR BEST WEEK

28 September.—After completing her repairs, the *Karlsruhe* proceeded to her coaling place. On the way we met the *Asuncion*. She had emptied the *Strathroy's* bunkers and then sunk her. The *Strathroy* crew transferred to the *Krefeld*.

29-30 September.—While coaling we received the joyful news that the Fortress of Maubeuge had surrendered with 40,000 men, four generals and 400 guns. We even received news of the *Emden* and were very pleased about her successful cruise.

1 October.—Loaded to the limit with coal, we started back to our region of operations on 1 October. The entire main-deck and quarter-deck were piled about 1 meter high with coal. The ship did not ride the high seas very well, vibrating as each large wave passed under her.

2 October.—The following day the *Asuncion* brought as a lot of important telegrams.

Our auxiliary cruiser *Kap Trafalgar* had been sunk. That was a sad message.

Our cruiser squadron was on its way to South America. The English cruisers *Good Hope*, *Monmouth* and *Glasgow* had started to the southward. We were anxious to learn the result of the events that would soon take place off the west coast of Chili. In addition to those named above, three other English warships had rounded Cape Horn.

A great coal famine existed in Brazil. In the large cities only a limited amount of electric lighting was permitted. The trains had reduced their schedules. (We thoroughly understood the reason for this!) The government had forbidden the export of coal. If, even in spite of this, the English ships left Brazilian harbors "loaded down with coal," then we knew how poorly the neutrality laws were being observed, which must not be ascribed entirely to the bad feelings of the Brazilians but mainly to the pressure which England exerted upon them.

3-5 October.—For two days we lay in wait without results. About noon of the third day the *Krefeld*, that had been sent by the captain several miles to the eastward, sent us the signal: "I have a steamer in sight."

The vessel was steaming to the eastward of the usual trade lane. Therefore she could not have a very clear conscience!

This time the chase lasted two hours. Therefore our joy was all the greater when we received the report: The English steamer *Farn* has 7000 tons of the best Cardiff coal bound for Montevideo from Barry. As the Chinese and German crew of the *Strathroy* had been relieved of their duties, this cargo saved their lives. She would take the place of the *Strathroy*. Lieutenant of Reserves Lubinus would be her new captain.

The captain had planned to send this coal to our cruiser squadron later on when their scene of operations was nearer and definitely known.

According to the story of the captain of the *Krefeld*, the English crews took a great part in the chase of the *Farn*. As soon as they saw the smoke clouds of the steamer they reported the fact to the captain and officers. During the chase they made bets as to the nationality of the steamer. Most of them wanted to bet on the English. When the flag was recognized they yelled in delight. The chase caused as much excitement, and apparently as much pleasure, for the Englishmen as it did for us.

The captain of the *Farn*, no doubt, pulled a long face when he climbed the *Krefeld's* gangway and was met by the sound of his countrymen's voices.

The captains of the steamers living on the *Krefeld* must have had mixed feelings as they watched the undisturbed operations of the German cruiser. They, of course, knew nothing of our worries, the constant lookout for enemy radio messages and the frequent signs of the approach of enemy warships. I wonder what the captain of the *Strathroy* thought, he who had witnessed the *Karlsruhe's* operations since 1 September.

At the beginning, when approached on the subject, the Englishmen aired their views in words somewhat as follows: "Just you wait! Before long our cruisers will be at your heels and then your little hour will come." Finally, however, they lost these hopes. And when anybody reminded them of their "navy" they would bite their lips and commence to swear.

On this very day an English warship patrolling between Cape Verde and South America came in our immediate vicinity. During the night his radio became so "howling" loud that the captain decided to steam several miles to the eastward. We stopped about 30 miles to the eastward of the usual trade lane.

6 October.—This time the *Rio Negro* was lucky. About 4.00 p. m. we received a report from her concerning the English steamer *Niceto de Larrinaga*. The prize crew went over. We, who remained aboard the *Karlsruhe*, pictured the usual procedure. Soon after the arrival of the prize officer the steamer crew would be gathered together. After the reports of the prize officer in regard to cargo, nationality, destination, etc., had been signalled over by the prize quartermaster the captain would signal back his decision: The steamer should be sunk. We pictured the prize officer informing their captain—a biting of the lips and then the usual nod ("All right, sir")—then a word to the gathered crew; all hurriedly disappear below decks. We knew that they were now packing their clothes and trinkets and would soon appear once more. The boats would be stowed and made ready for lowering.

Soon the captain himself would appear, chronometer and other nautical instruments under his arm. He had saved what was really valuable.

The *Niceto de Larrinaga* had a cargo of 8000 tons of oats and corn from Buenos Aires for London. Her crew and provisions went aboard the *Krefeld*. She herself took the road of all her predecessors except those we were using as colliers.

The steamer had a radio outfit. Like all the other steamers, she made not the slightest attempt to call English warships to her assistance, and even though the chase would only last one hour, she must have known that several ships were in the vicinity, and these would have known we were a German cruiser from the message.

We noted in her radio logs that she had been warned of us by the *Bristol*. The cruiser had advised her to steam about 30 miles to the eastward of the usual steamer tracks. It was her bad luck to follow this advice and run right into our arms, because we had gone that far to the eastward to escape the English cruiser.

The English captain was very astonished to be captured in spite of his caution. But he was still more astonished when our prize officer told him that we knew his course and had tracked him out there. Then, he said, we had probably caught the steamer that left Buenos Aires with him and was travelling the same course. The prize officer increased the captain's sorrow by saying that we were unfortunately delayed in capturing another steamer, whereupon the old man harmlessly remarked that we had better wait until morning; there were three of them leaving Buenos Aires at

the same time, and the third one, which was slower than his ship, would surely pass along here.

7 October.—We did not have to wait long for the expected steamer. About 7.00 a. m. she came in sight. We steamed ahead slowly to meet her. She anticipated her fate and hoisted the English flag when still a great distance away. At 8.00 o'clock we stopped the steamer *Lynrowan*. The calculation came out correctly. The captain did not seem to be surprised when the prize officer, this time more truthfully, assured him that we had been waiting for him since yesterday. Soon thereafter he was greeting his colleague on the *Krefeld*. They probably were very angry because the third one, or rather the first one, had had more luck and escaped us!

The captain had his sick wife and a young nurse on board. They were the first feminine guests on the *Krefeld* and were received with a great outburst of enthusiasm.

The *Lynrowan* had a cargo of 5000 tons of corn, sugar and tallow in hogsheads, and 12 automobiles received at Buenos Aires and bound for Liverpool.

The gunnery officer, Lieutenant (J. G.) von dem Borne, had begged the captain to give him this prize as a target for gunnery practice. After the *Krefeld*, with her Englishmen, had disappeared over the horizon, we made a run at extreme range, using target-practice ammunition, and then made several runs at close range using reduced charges.

The steamer *Lynrowan* sank about 3.00 p. m. The cargo hatches burst open when the ship was down deep under the water, and all the buoyant contents of the cargo holds, above all, several hundred hogsheads of tallow, shot to the surface. The captain tried to destroy this extensive field of wreckage by making several runs back and forth across it. But the hogsheads persisted in coming back in one bunch. The sharks gathered at once and fought over the lumps of tallow floating out of the splintered casks. The sharks experienced a rare thing, for these regions, in their hunt for game; numerous fat rats were running around on the casks trying to save themselves from the wreck.

It is not entirely safe to steam over a spot where a ship has recently been sunk. All sorts of wooden articles, such as yards, poles and cargo booms, break loose down in the depths and shoot up to the surface with great force. The force that tears them away down below is sufficient to break the heavy shrouds, etc., that

hold them in place. Even boats often break loose from their lashings and appear on the surface. In order to prevent their playing the rôle of traitors and later on giving away the sinking of the ship, it is advisable to punch holes in them before blowing up the ship. I consider it possible for the heavy timbers shooting up to the surface to actually pierce the ship's bottom.

The Englishmen on the *Krefeld* heard our firing and decided that we were in action. In their agitation they began to cause trouble. The next day the captain had this case investigated. It appeared, however, to have been entirely harmless.

From the Argentine newspapers which we found on board the last two steamers we discovered that Admiral Cradock had taken the *Good Hope* with him to the southward and had therefore shifted his flag. The *Good Hope*, *Monmouth* and *Glasgow* had remained in Montevideo for several days and celebrated just as they would have done during peace. Cradock and his flag lieutenant, Cumming, were pictured as heroes in all the newspapers. But there is no use in grumbling over the unfriendly actions of the neutral Uruguayans.

8 October.—The first rays of the rising sun had barely begun to paint the eastern heavens red when another steamer was sighted. She set her flag at once but soon hauled it down again when she recognized us. But we did not have to see her flag to recognize the colors of her smoke-pipe—blue funnel with black top and a broad white band—as belonging to one of the English steamers of the firm of Lamport and Holt of Liverpool. We were close aboard her by 7.00 o'clock. On her stern was the proud name *Cervantes*.

The signal of the prize officer told us the following: "4500 tons of cargo, fodder, sugar, hides and wool. The steamer came from South America and is heading for Liverpool. The crew consists of 43 men, practically all of whom are English, including four passengers from Punta Arenas and Rio Grande do Sul." These four were something new and were thankfully received as a welcome diversion.

After these 47 were received by their compatriots and fellow-sufferers in captivity on the *Krefeld*—the transshipment was accomplished very quickly this time because they had all previously packed their clothes—the prize officer went ahead with the blowing-up. He had devised a new scheme (the memory of

Bowes Castle still rankled!) : the bombs were secured outboard below the water-line. We all anxiously awaited the result, and this time we were not disappointed. The explosion tore a great hole in her. The steamer sank very rapidly. About noon she painfully rose up out of the water for the last time and then shot stern first down into the depths.

There were now about 300 involuntary guests aboard the steamer *Krefeld*. The captain decided it was time to send these unnecessary eaters away. He therefore called Captain Vieth aboard for a conference. A neutral harbor, not too near, had to be chosen for their landing. The captain decided on Teneriffe as being the best suited for the purpose.

In order to get an idea of the "chaos of races" on the *Krefeld*, attention is invited to the following summary. On the 11 steamers captured since 1 September (excluding *Bowes Castle*) there were:

205 Englishmen (of whom two were women)
 8 Finns
 7 Russians
 1 Belgian
 2 Frenchmen

Total of 223 citizens of enemy countries.

107 Chinese
 22 Spaniards
 10 Hollanders
 13 Swedes
 4 Americans
 2 Italians
 3 Chilians
 4 Norwegians
 1 Dane
 3 Swiss
 2 Mexicans
 1 Ecuadorean
 1 Cuban
 1 Greek
 1 Arab (Mohammedan)

Total of 175 citizens of neutral countries.

All told there were, therefore, 20 different nationalities!

But before the steamer was released another addition arrived. About 11 p. m. the lights of a steamer hove in sight and we brought her to with a blank shot about midnight. In answer to our question she signalled back: "*Pruth* of London."

She had 2300 tons of barley and 3800 tons of saltpeter from Chili and was proceeding to St. Vincent under charter.

We intended to sink the steamer the next day. After sending a watch crew aboard her she remained stopped close to us.

9 October.—Early in the morning the crew of the *Pruth* was transferred and then the vessel was sunk. She sank about 10 o'clock.

Shortly after noon we stopped the Spanish mail steamer *Cadiz*. Her decks swarmed with passengers, and, of course, they all ran to the side towards us in order to stare at us, thereby giving the large steamer a heavy list.

Those passengers capable of judging such things must have wondered concerning the appearance of our ship. The results of the constant coaling could not be erased entirely. There was only one thing as immaculately white as it was during peace times and that was our flag.

They could not help being astonished over the appearance of our cutter's crew. They thought we were approaching starvation. But that was not the way our men looked; the excellent, sufficient and ever-fresh supplies of our prizes agreed with them remarkably well. The sun had burned them a reddish brown. They looked like Indians. We could have used them as medical advertisements. The cutter's crew were not exceptions to the general rule. The all-around physical condition of the men was very good. Had it not been it would have been impossible for them to have stood the strenuous work of coaling and hoisting cargo out of steamers in this glowing heat. Naturally the firemen suffered most from the effects of the heat. Therefore they did not appear to be so robust and full of strength and health as did the seamen. But even among them there were none seriously ill.

The steamer *Cadiz* was released very soon and then showed her gratitude by a vigorous blowing of the steam-whistle which we answered with pleasure. In addition we sent her a flag signal: "Pleasant trip."

10 October.—During the early morning hours we again stopped and released a neutral steamer. This time it was a Norwegian named *Bergenhus*.

The time had come again when we had to plan on filling up our coal bunkers. We headed for the rendezvous of the *Asuncion* and *Farn*.

Our most successful week lay behind us. Our last coaling on 1 October had certainly paid for itself. Since 5 October we had captured a steamer each day.

TAKING LEAVE

11 October.—About three o'clock the following afternoon, as the *Karlsruhe* approached the place where the *Asuncion* waited, the lookout reported three steamers ahead. He was scolded for not being able to count up to three. He refused to change his opinion, and soon we, on the bridge, could make out six mastheads that were soon followed over the horizon by three vessels. One was running away at high speed. The others remained quietly lying where they were. At the same time our radio operator reported that the *Asuncion* was yelling for help as she was being chased by an enemy ship. The running steamer therefore could not be other than the *Asuncion*. We quieted her and soon thereafter she appeared over the horizon.

Meantime the *Karlsruhe* had increased her speed and was rapidly approaching the other two steamers. One of them hoisted the German flag. That was the *Farn*! The other pulled and hauled on the English flag. We had to laugh!

Captain Lubinus then told us the following story: Shortly before the *Karlsruhe* came in sight a steamer appeared at the rendezvous flying the English flag. Thereupon Lubinus hoisted the English flag on the *Farn*. The Englishman hoisted his signal number "*Condor of London*" and asked the *Farn* for her name and destination which he quickly gave. Then there followed a long series of flag signals asking if the *Farn* had any war news, whether she knew anything of the English men-o'-war, etc.

When the conversation was getting irksome the *Karlsruhe* appeared over the horizon. The Englishman and the *Asuncion* had taken us for a British cruiser. The latter then took to her heels but the Britisher did not move. The *Farn* then did likewise as she had recognized us.

We could not ask for a more delightful way of capturing a steamer!

The *Condor* was an ugly ship with a poisonous-green smoke-pipe. But we looked at her with different eyes when we learned what she carried: Merchandise, especially provisions, dynamite, and 150 tons of lubricating oil. She came from New York and was bound for Chili. The captain had been warned of us and had

navigated very cautiously. He had made a great sweep to the eastward of the West Indies and carefully avoided all commercial lanes. He certainly did have rotten luck!

We were especially pleased with the lubricating oil which we could use very nicely as fuel oil. And the provisions also came in very handy, because our own stock, as well as that of our auxiliary, was getting low. The dynamite bombs were a welcome addition to our explosive bombs, which we used for sinking steamers, only a few remaining on hand at that time.

The steamer was therefore captured and all the boats we had were used to unload her. That was not easy, and it took a longer time than we had expected because the oil barrels were on top of the other cargo and had to be hoisted out of the way first. Included in the cargo was a quantity of large window panes. Fortunately we did not have to handle these carefully or there would have been no end to the work.

The crew of this steamer was also wished on the *Krefeld*. Among them were five Germans who were to be enlisted in our service.

12-13 October.—The unloading of the prize lasted the entire following day and the day after that.

After generously providing the *Krefeld* with all the provisions possible she was finally scheduled to be released on 13 October. In the course of the afternoon an officer of the steamer came aboard as representative of the English captains and their steamers' crews. He thanked our captain in their name for all the favors and the consideration shown them, both when alongside the cruiser and when aboard the accompanying ship. The captains would not fail to make reports to their government about this.

At 4.00 p. m. the *Krefeld* started for Santa Cruz de Tenerifa, where she should not arrive prior to 22 October. To celebrate the leave-taking she hoisted an especially large flag and then made a turn around H. M. S. *Karlsruhe* and the other steamers. We had our band on deck and played the piece that is usually played when German seamen part from each other: "Musz i denn, musz i denn zum Stdtele hinaus." [Translator's Note: This is not pure German. Literally translated: "Must I then, must I then go away from the village?"] And then the steamer that had shared our joys and sorrows for a month and a half slowly disappeared from sight. She took our mail with her. After two months our relatives might now get some word from us for the first time.

About 10.00 p. m. we had finished transshipping the oil from the *Condor*. We could not blow the ship up because of her dynamite cargo. So we had to content ourselves with opening her valves and breaking in her side-ports. This last precaution hastened the sinking very much. At each roll great quantities of water streamed through these ports into the hull of the ship until finally the ports reached the level of the water. And then the steamer ended the struggle in a very few minutes.

The *Rio Negro* was detailed to await the finish. The *Karlsruhe* and the *Farn* had started off to coal.

14 October.—While on the way we lighted our oil-burning boiler, in order to test the mixture of lubricating oil and petroleum. The result was, on the whole, very pleasing.

15-16 October.—Not since the beginning of the war was the *Karlsruhe* so well provided with fuel as she was on 16 October when, having finished our coaling, we set off to waylay some more steamers. We had 180 tons of fuel-oil and 1500 tons of coal on board, of which 1100 tons was the best Cardiff coal. This entire load of fuel came from our prizes. The supplies, brought along by our steamers, had hardly been touched.

17 October.—When we met the *Rio Negro* the next day her captain reported that hardly 10 minutes after the sinking of the *Condor* two extremely heavy dynamite explosions took place. The steamer must have been down to a considerable depth by that time. The concussion was so strong on the *Rio Negro*, even though she was several miles away from the sunken steamer, that the compass cards jumped from their spindles.

Soon we met the *Asuncion*. This steamer had discovered the surprising but pleasing news that the Fortress of Antwerp had fallen. This must have been a heavy blow to England. All the newspapers had said that Antwerp could not possibly be taken, so now they could not minimize the importance of this victory. In spite of that, however, the English did try to do this, as we discovered later on.

18 October.—We had just reached our old place to the northward of the Island Fernando Noronha when the lookout reported a vessel in sight. We caught up with her in an hour. It was the English steamer *Glanton* of London.

"Thirty-seven hundred tons of coal from Cardiff for Montevideo for the firm of Wilson and Sons, crew English," read the signal from the prize officer. "Steamer is captured, prepare to

sink her" was the prompt reply of our captain. We did not need the coal at this time, and we had no men to spare to man the steamer.

The *Rio Negro* succeeded to the duties of the *Krefeld* and took the crew and all the provisions of the prize on board.

As the *Glanton* was rising from the sea for the last time and then disappearing to the never-to-be-seen-again regions, a second steamer was sighted and the chase began at once. But it was the Dutch steamer *Zaanland* from Amsterdam. We had no reasons for doubting her movements or appearance. The captain permitted her to proceed without even stopping her. The same thing happened to an Italian that we saw late that evening.

19-22 October.—Although we had met three steamers on this day, the next three days passed without any successes at all. The *Rio Negro* and *Karlsruhe* drifted around, engines stopped, hunting the horizon until our eyes got tired.

On 22 October, in honor of the birthday of our Empress, we celebrated by having "Sunday routine." After a short religious service the captain addressed the crew. He eulogized this Imperial Lady, mother of her country, and her devotion as leader of the Red Cross, setting a wonderful example to all German women. He reminded them also of the fact that she was a real German mother that had the same worries as other mothers had, in that she had six sons and one son-in-law, all of whom were in the field. Three spirited and heartfelt "Hurrahs" thundered over the deep blue depths below the equator in honor of our Empress and the Imperial Family.

On this day the result of our deeds would be spread from Tenerifa to our homes and to the entire world! Each one thought he had to remind the others of this fact.

We waited the whole day hoping for an Empress'-birthday prize. When, about 10.00 p. m., we sighted the lights of a steamer we thought our hopes had been fulfilled at the last hour. But the vessel was found to be the Swedish steamer *Atlant* of Gothenburg that was heading to the southward. We had to let her proceed, and did it without even stopping her.

23 October.—As a reward for our unsuccessful chase, the next day brought us the English steamer *Hurstdale* from Liverpool with 4600 tons of corn bound from Rosario to Bristol. She made little work for us. Just as she was half sunk and making her last efforts to resist her doom, another steamer was reported, but

this time it was a Swede. She was the *Annie Johnson* of Gothenburg. We stopped her but set her free immediately.

24 October.—Due to the arrival of our prize crews at Teneriffe, the Englishmen must now know of our operations on the northeast coast of South America, and the manner and means in which we increased our coal supply and planned our future operations. We could therefore assume that our beat which we had patrolled since 1 September would be carefully searched in the near future.

As a matter of fact, in these days we once more recognized the radio signals of the English warships which cruised in our immediate neighborhood for the first time in a long while.

When we were going south from the West Indies the captain had an idea that it would be a good thing to shake up the many English and French colonial possessions in the Lesser Antilles. He especially had in mind a joke on the French island of Martinique and the English Barbados. But at that time he had to give up these plans because he was not sure of his coal supply. Now, however, he had taken up this scheme once more. You can imagine how pleased we all were about this.

Aside from the fact that the English would now carefully search our scene of operations up to this time, there now remained but little chance of our capturing any more enemy merchant ships. The experiences of the past month had taught us that the English steamers were not using the main travel lanes very much. All of them were making great detours. The number of neutral steamers that we met increased considerably.

Therefore the captain decided to leave our old place for a while until the shipping quieted down again, and to suddenly bob up in the West Indies to carry out the aforementioned little jokes.

25 October.—We gathered all our steamers about us, *Rio Negro*, *Asuncion* and *Indrani*. Each one received detailed instructions for the next few weeks. Then they were released. The *Farn*, our collier, was the only one to follow us on our cruise to the northwestward.

VANDYCK

26 October.—We had proceeded a good distance away from the active lanes of travel to South America when on the morning of 26 October, to our great surprise, the lookout reported a steamer bearing east-southeasterly, steering a northerly course. When we saw her high white upper-works we knew from a distance that she was a passenger steamer. Then we recognized the colors

of the smoke-pipe—the sign of the firm of Lamport and Holt. The steamer was stopped about 11 o'clock. It was the *Vandyck*, the third largest steamer of this company, over 10,000 tons displacement and only three years old.

The daintiest morsel had fallen most unexpectedly at our feet!

In addition to 210 passengers, of which 112 were in the first or second cabin, mostly North Americans, the steamer had 130 bags of mail, \$2500 of the firm's funds, a large cargo of general merchandise and about 1000 tons of frozen meat. She was bound from Buenos Aires to New York via Trinidad and Barbados.

She had been warned against us by the *Bristol*. The captain had exercised great caution in that he ran darkened at night and did not use his radio for six days. Therefore he was most surprised when our prize officer very seriously told him that we had been waiting for her since yesterday!

Her captain was an old man and he lost his balance due to this misfortune. We always gave the crews of our prizes the choice between being quartered aboard the *Karlsruhe* as prisoners of war or of signing an agreement not to take part against us or our allies during the rest of this war. If they elected the latter, we promised to set them free as soon as the next opportunity presented itself. Up to this time all the Englishmen had signed the agreement without hesitation. When this agreement was submitted and explained to the crew of the *Vandyck* the old captain made an exciting speech to his men. The prize officer found it necessary to report this to our captain. The latter immediately sent two armed men aboard the steamer to take charge of the captain. Meantime, however, his more level-headed officers had quieted him so that this measure was not necessary. This was the only case of an English captain trying to create a disturbance.

The passengers had, until the very last moment, taken us for an English cruiser. When they discovered their mistake there arose a grand howl. Because of the senseless infamy heaped upon our armies by the South American press (under English-French control) the passengers had expected the worst possible treatment and robbery at the hands of the "Huns." This madness was not confined to the between-decks passengers, who are usually of ordinary and uneducated extraction and who, therefore, may be excused because of their ignorance. Among the first-class passengers was the Columbian diplomatic representative to Argentine, a mestizo, with his wife and child. He had had the foresight

to request our ambassador in Buenos Aires to write a letter to the commanders of all German warships. This he presented to our prize officer, and, shivering from head to foot, he begged that he, his wife and child, be spared! He did not subside for a long time, even after the captain had sent Ensign Count Beissel to the steamer to attend the diplomat and his wife.

When the passengers finally understood that we had no idea of hurting a hair on their heads nor of taking their property, the astonishment was great and the gratitude effusive.

In order to give the passengers ample time to pack up, the captain delayed unloading the steamer until the next day. Meantime all our henchmen were recalled by radio and they arrived one after the other. Those on the *Vandyck* were certainly surprised to see the swarm of ships floating all around.

The transfer of baggage was to commence at 6.00 o'clock the next morning. The passengers were permitted to eat one more comfortable noon meal on the *Vandyck* on the 27th. Then they were to follow their baggage over to the *Asuncion* and, along with the crews of the last three steamers, be taken to a neutral harbor.

As our provision supply, such as fresh meat, flour and rice (the last was necessary for the Chinese) had been considerably reduced, the wonderfully supplied steamer came in very handy. Therefore the next day was to be devoted to a wholesale transfer of provisions.

27 October.—During the night a part of the crew, especially the firemen, got drunk. This had usually happened in the case of the other steamers if the men were given sufficient time to save as much of their rum as they could. A drunken sailor from one of these steamers jumped overboard and it took considerable trouble to fish him out again.

Another thing that usually happened aboard the ships was the fact that as soon as a steamer was captured the officers lost control of their men. They would then besiege the captain—demanding that they be paid and attempting to break into the stores, especially if they thought these contained alcohol. In several cases the prize officer had to intervene in order that their captain would be obeyed.

The first officer of the *Vandyck* had requested permission to superintend the transfer of the baggage. He and the other ship's officers behaved very sensibly, and did their best to lighten our work and to do what they could for the unfortunate passengers.

The ship's boats had been packed full the day before. Promptly at 6.00 a. m. the first officer directed that they be lowered. The passengers were watching this work and saw a most surprising spectacle: all the wooden boats of the large and new passenger steamer were leaky and soon filled with water so that all the baggage was thoroughly soaked. The suffering passengers raged. They cursed the first officer and then the captain until they were finally quieted by the officers of the *Karlsruhe*, who were watching the performance.

The German steamboat then took the heavy, wet boats in tow and, about noon, the transportation of baggage was finished.

After the noon meal the transfer of passengers to the *Asuncion* began. They were all aboard her by 7.00 p. m., including the crews of the steamers *Glanton* and *Hurstdale*; also a 10 days' supply of provisions.

The *Asuncion* was a much smaller steamer than the *Vanduyck* and was not fitted to take care of so many passengers. The women and children were all assigned cabins, but as there were not enough of these, the captain and the ship's officers surrendered their rooms to them. The men had to find places on deck as best they could.

The captain had a notice posted in the salon and in the steerage. In this notice he invited attention to the lies that had been published in the press which had caused so much uneasiness among the passengers. German soldiers and sailors would never rob an unfortunate traveller of his property, much less attempt to take his life. In regard to the English, this might be the case, as they paid their naval officers and seamen prize money, that is, with the property of strangers. This custom, dating back to the days of piracy, was unknown to the German Navy. The German Navy was accustomed to doing its duty which required us to capture enemy steamers and to treat neutral passengers with every possible consideration. The only real way to escape inconveniences was to travel, not on English, but on neutral steamers.

This notice was read with interest and then widely discussed. Taken full and by, the opinions of the passengers were not bad. They accepted the inevitable in their predicament. They gave a letter to the officer who had charge of their transfer in which they thanked him for his courteous treatment: "No one with reason could expect more under the circumstances."

The presence of two American newspaper reporters was not an unfortunate thing at this time.

The women and children begged for souvenirs and especially wanted *Karlsruhe* cap ribbons and uniform buttons.

After the *Asuncion* had received our mails, Captain Fritch was ordered to take her to Para. He was to arrive there on 1 November. Captain Fritch was very sorry to have to leave us. He asked me to tell the captain that he would much rather share the joys and sorrows of the *Karlsruhe*.

The transfer of provisions from the *Vandyck* continued through the night. Shortly before midnight lights were sighted. It was a steamer heading directly for us, so that we hardly had to move in order to stop her. We were not a little pleased to discover that she was an English vessel by the name of *Royal Scepter* from London. She had noticed the gathering of ships. That pleased her so she decided to find out what was happening here in the middle of the ocean. She ran straight into our arms. Unfortunately, however, she had a very valuable neutral cargo of coffee. This was estimated to be worth about 5,000,000 marks, while the steamer herself was an old and worn-out craft. The captain decided, with a heavy heart, to turn her loose. About 1.30 a. m. her lights disappeared from sight.

28 October.—Early in the morning, about 6.30 o'clock, the steamer *Vandyck* went to the bottomless depths.

THE END

29-30 October.—The *Karlsruhe* with her three remaining steamers set out for the West Indies. On both the following days the bunkers were filled from the *Farn* and, on 1 November, we filled up again. Then the *Farn* was left behind while the *Rio Negro* and the *Indrani* followed us.

2-3 November.—In addition to the jokes on the English and French colonies, the captain had decided to institute proceedings to create uneasiness in the steamer-lanes between the English Barbados and Trinidad.

The island of Barbados was chosen as the first objective. We knew that several large liners which we intended to sink would be in this harbor. Nothing would be more effective than such an undertaking to hurt the cause of England in America and the West Indies. We were all anxiously awaiting the events of the next few days. Never before was the morale on board better than

during this period. The crew had not been told as yet of our plans. But to get an idea of what the men thought let me relate the following story: My boy (servant) had been seriously ill with malaria which he had contracted in Mexico. He had just recovered from a severe attack and was released from the sick-bay. When I asked him how he felt he did not answer my question but said, "The sinking of steamers is very nice, but time is hanging heavily on our hands. It is high time that our guns got a chance to do something. That would be some diversion."

That is what all our men on the *Karlsruhe* thought.

This good humor called forth on 4 November a small feast in our mess, although there might have been another reason in that our cook had, after a long wait, finally received fresh butter, frozen poultry and other costly food supplies from the *Vandyck*. The first officer directed that red wine be served. Our mess room was decorated with the potted plants and flowers taken from the salon of the *Vandyck*.

4 November.—About 6.30 p. m., on 4 November, H. M. S. *Karlsruhe* was in latitude $10^{\circ} 7'$ North, longitude $55^{\circ} 25'$ West.

It was in the hour just preceding the short tropical twilight. The captain and the watch officer, Lieutenant (J. G.) Freiherr von Althaus, and the helmsman and signalman of the watch, were on the navigating bridge. The men had finished supper and were gathering as usual on the foc's'le to listen to the ship's band that had assembled under the bridge. The commissioned officers and the warrant officers were still at dinner in their mess rooms in the after part of the ship where were also the deck, engine-room and fire-room watches, boys, stewards and cooks.

The steamers *Indrani* and *Rio Negro* were following the cruiser at a short distance.

The first officer had just risen from the table and some of the officers had decided to leave the after end of the ship and go up on the cooler bridge, when we felt a heavy shock, followed by a dull cracking and gnashing as the ship shuddered. The electric lights went out.

The ship immediately took a heavy list to port.

Somebody in the officers' mess yelled "Torpedo hit!" This idea was mechanically conveyed from one to the other. We hurried to our battle-stations.

Before I could reach the poop, my station as second gunnery officer at "general quarters," I heard the call, "Close water-tight doors!" and the customary five short strokes of the ship's bell.

Ahead of our bow I saw the bottom of a floating ship which sank immediately. I thought it was some strange craft with which we had had a collision, even though this seemed impossible to have occurred. Actually, however, it was the forward half of our own ship.

A powerful explosion had blown H. M. S. *Karlsruhe* into halves.

The place where the explosion occurred and the immediate neighborhood, which included that part of the ship from the bow to the forward smoke-pipe, also the navigating bridge and foremast, must have been blown to atoms. No one saw a piece of it.

The forward part, with the majority of the crew, sank after a very few minutes. Only a few men, most of whom had been thrown a good distance away, could be saved by the after end of the ship and their boats. All of them were more or less seriously burned or mutilated.

The after end, in which all the water-tight doors had been closed, remained afloat for about 20 minutes. This fact, a glowing testimonial to our ship's material and the German construction, was the main reason we few remaining ones were saved.

The two accompanying steamers saw the catastrophe, saw a column of flame 100 meters high, and hastened to do all they could; they came up at high speed and lowered all their boats.

Our own boats were quickly lowered and assisted the steamers' boats in searching the unfortunate spot for any survivors.

After the first officer and the engineer officer on watch had inspected all the lower compartments in the ship and had made sure that there were no more aboard, the last boat, full of officers, left the ship. We had hardly gone 100 meters from the ship when her stern lifted straight up out of the water so that we could distinctly see her propellers and rudder. The boats were still hunting for swimmers, but when the rest of H. M. S. *Karlsruhe* shot suddenly down to the depths all the men in the boats gave three "Hurrahs!" to her and to our comrades.

Then all was quiet in our little circle. A heavy load of pain and sorrow lay upon us, and before us were the questions: How? and Why?

These questions will never be answered.

The catastrophe had befallen us so suddenly and with such force that we had no time to make clear estimates of the reasons

or results. By and by when all the survivors were assembled on the *Rio Negro* and it was seen how many of our comrades were missing, and when it was settled beyond doubt that our captain, that excellent man, honored and respected by all, had drowned with our good ship, then we all began to understand the extent of our losses and how hard this accident had hit us.

Each man on board ship had made up his mind that the end of our war cruise would come some day, and all hoped that it would be in battle with the hated enemy, proving that German patriotism and devotion are not empty words. How else could the end come?

THE RETURN HOME

The search for survivors of the sunken vessel was given up as useless on the following morning.

What should be done next?

The answer was not hard to find. There were two courses of action open to us: We had to make an effort to place ourselves and our men at the disposal of our Fatherland as soon as possible. Also we had to conceal the loss of the cruiser as long as possible. The English could not possibly know of it, Lord be praised! The excellent work of H. M. S. *Karlsruhe* had severely damaged the English trade on the North Atlantic Ocean, causing no end of uneasiness. Until the arrival of our cruiser squadron, which was very indefinite as yet, there was no other ship available to replace our cruiser. The sinking of H. M. S. *Karlsruhe* would relieve the pressure on the English and then all the results of our work would have gone to naught at one stroke. But if we were able to keep her loss a secret the uneasiness in English commercial circles would continue for another month. A considerable number of English warships were detailed to search for us, which was another advantage for our cruiser squadron.

The idea of trying to join the cruiser squadron was dropped. We were soon unanimously of the opinion that we should attempt to break through to Germany.

There were several ways of carrying out this plan. We might proceed to some neutral American harbor and then each individual could have undertaken to make the dangerous trip back home. Or we might proceed on our own steamers direct to Europe and attempt to go straight to Germany.

After a short argument we decided on the latter course. Getting back via America was very doubtful. We did not have the neces-

sary clothes. Our outer garments were so noticeable (uniforms) that we would most certainly have been recognized and interned. We also had read in the newspapers that the English did not hesitate to take German citizens and people of questionable citizenship off neutral ships. Above all, however, the minute we arrived in a neutral harbor the secrecy of the *Karlsruhe's* loss would be broken. Even if our hundred-odd men were able to keep absolute silence—past experience had taught us how difficult this really is!—we still could not expect that much of the Chinese on the *Indrani*. This last consideration decided the question.

We could now divide our crew between the two steamers. If one were captured we still had a chance for the other half to get through. Should the English capture both steamers—we were absolutely helpless!—that would have been fine business for them; and we could not begrudge them that chance.

So we decided to sink the *Indrani* as soon as we had thoroughly filled up for the long cruise. Then the *Rio Negro* steamed northward.

While underway we picked up a variety of reports, good and bad. Our cruiser squadron had won a victory over the English at Coronel; the efficient *Emden* had met her end.

As we steamed into the northern latitudes the scarcity of clothes was felt. Of course, the steamer crew helped us out most willingly as far as possible. But we were too many for them.

Our seamen made clothes for themselves out of old canvas and woolen coverlets. The results, however, were more apparent than real; the men looked picturesque, some like characters in fables, some like comedians, but all froze just the same.

We had decided to head for Norway and wait there until we picked up some reports and news (for instance, concerning the English watch in the North Sea and the Skagerrak) and then act accordingly, *i. e.*, whether the individuals would proceed home overland via Norway and Sweden, or whether we would take our steamers on in to Kiel or Wilhelmshaven.

Not having received any important reports, and without having sighted a single enemy vessel, we arrived at a Norwegian harbor in the forenoon of 29 November after a journey of practically four weeks.

We had broken through! The English blockade lines were behind us. Were the efficient Britishers asleep? Or was it the bad weather and the high seas which we experienced that were

too much for their famous seamanship? All our dreams of the barbed-wire fences around English prison camps had vanished.

I chose to continue my journey overland with Ensign of Reserves Eyring. There was always danger that the steamer *Rio Negro* might be taken on the last leg of her cruise. It was not possible for our men to make the overland trip in their clothes without exciting suspicion, so they had to be taken along on the steamer.

I wanted to make sure that I would safely reach home with the most important reports, especially my war diary which, except for a few official papers that I was able to rescue on 4 November, constituted the only record of the cruise and fate of the *Karlsruhe*. On 4 December, a beautiful sunshiny winter day, the two of us arrived on German territory at Sasznitz and were arrested by the first German landsturmer that we met.

A few days later we heard the good news that the *Rio Negro* had dropped anchor in German territory.

ROSTER OF OFFICERS ON H. M. S. *KARLSRUHE*

Order of Seniority	Rank	Name	Duties and Other Remarks
1	Commander...	Erich Köhler	Commanding. Died 4 Nov., '14.
2	Lieutenant	Studdt.....	1st Officer.
3	"	Thierfelder.....	Navigator. Later commanded "Kronprinz Wilhelm."
4	Lieut. (J. G.)..	v. dem Borne.....	Gunnery Officer.
5	" ..	Aust ¹	Adjutant.
6	" ..	Wilhelm Schröder.	Torpedo and Prize Officer.
7	" ..	v. Althaus.....	Radio Officer. Died 4 Nov., '14.
8	Ensign.....	Kurt Schwarz.	
9	" ..	Vanselow.	
10	" ..	Dittmer.	
11	" ..	Count Beissel v. Gymnich.	
12	" ..	Eyssen.	
13	Eng. Lieut....	Grabe	Chief Engineer.
14	Eng. Lt. (J. G.)	Merk.	
15	Eng. Ens.....	Beck.	
16	Lt. (Doctor)...	Warnecke	Ship's Doctor.
17	Pay Lt. (J. G.)	Meinhardt.....	Ship's Pay Officer.
18	Lt. (Reserves)	Frese.....	Rec'd from "Kronprinz Wilhelm."
19	Ens. " "	Eyring.....	Rec'd from "Kronprinz Wilhelm."
20	" " "	Hentchel.....	Rec'd from "Kronprinz Wilhelm."
21	" " "	Hoppe.....	} Temporarily aboard from auxiliary cruisers.
22	" " "	Gundlach.....	

¹ Author of this book.

LIST OF STEAMERS CAPTURED BY H. M. S. KARLSRUHE

No.	Name of Steamer	Flag	Displacement, Registered Brutto tons	Character of Cargo	Value of ship in Marks ²	Date of Capture (1914)	Remarks
1	Bowes Castle...	English.	4,650	Saltpeter and silver metal.	1,500,000	18 Aug.	Crew landed at Maranhao, Brazil, on 2 Sept., '14.
2	Strathroy.....	"	4,336	6,000 tons coal.....	816,000	31 Aug.	Crew landed by "Krefeld" at Teneriffe on 22 Oct., '14.
3	Maple Branch...	"	4,338	2,000 tons mdse. and live stock.	918,000	3 Sept.	Same.
4	Highland Hope.	"	5,750	Ballast (refrigerating plant)	1,428,000	14 Sept.	Same.
5	Indrani.....	"	5,706	6,700 tons coal.....	1,264,000	17 Sept.	Same.
6	Cornish City....	"	3,816	6,400 tons coal.....	693,600	21 Sept.	Same.
7	Maria.....	Dutch (English Charter).	3,804	Wheat.....	?	21 Sept.	Same.
8	Rio Ignassa.....	English	3,817	4,800 tons coal.....	612,000	22 Sept.	Same.
9	Farn.....	"	4,393	7,000 tons coal.....	877,200	5 Oct.	Entered San Juan de Porto Rico under German prize crew, 12 Jan., '15.
10	Nicero de Lar-rinaga.....	"	5,018	8,000 tons fodder, corn, oats, machinery parts.	1,264,800	6 Oct.	Crew taken to Teneriffe on "Krefeld."
11	Lynrowan.....	"	3,384	5,000 tons corn, sugar, tal-low, hides, 12 automobiles.	591,600	7 Oct.	Same.
12	Cervantes.....	"	4,635	4,500 tons fodder, wool, sugar, furs.	714,000	8 Oct.	Same.
13	Pruth.....	"	4,408	3800 tons salt-peter. 2300 tons barley.	?	8 Oct.	Same.
14	Condor.....	"	3,053	Mdse. including dynamite and 150 tons lubricating oil.	408,000	11 Oct.	Same.
15	Hunstdale.....	"	2,752	4600 tons corn.....	?	23 Oct.	Crew taken to Para on "Asuncion."
16	Glatton.....	"	3,021	4000 tons coal.....	?	18 Oct.	Same.
17	Vandyck.....	"	10,328	Mdse. and 1000 tons frozen meats.	4,896,000	26 Oct.	Also had 210 passengers on board.
Total			76,609	More than	15,984,000		

² About 20 cents.

U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

COMMON SENSE IN WAR¹

By SPENSER WILKINSON

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There have been of late discussions on the subject of the proper use to be made of the fleet, discussions which reveal uncertainty about the aim and scope of naval warfare. The report of the Dardanelles Commission disclosed uncertainty of this kind among those who, during the term of the late government, had authority over the conduct of the war. That the functions of the fleet should be a matter of doubt, especially in high quarters, is nothing less than a national danger, for a mistaken employment of this powerful and costly force might lead to defeat and even to the collapse of the cause of the Allies and of the British Empire.

The objective of a navy is the enemy's navy. This fundamental principle was laid down independently of each other by the two clearest thinkers who have written systematically about naval warfare, by Admiral Philip Colomb in his "Naval Warfare," and by Captain Mahan in his "Influence of Sea Power upon History." In the judgment of these two writers, so long as a hostile navy exists, no objective other than that navy can be pursued, except at a hazard which ought not to be run. What does a man mean when, speaking of war, he refers to risks that ought not to be run? Is not war made up of danger, of risk, of hazard? How are we to know what risks are to be taken, and what not? That there is a line to be drawn is shown by the opinion of the masters of the business. "Do not imagine," wrote Nelson, on the 2d of July, 1804, "I am one of those hot-brained people who fight at an immense disadvantage without an adequate object." "Battles ought not to be given," wrote Napoleon, on the 21st of August, 1809, "unless one can reckon in one's favor 70 chances of success out of 100." In other words, the general or the admiral who

¹ Reprinted by consent from *The Nineteenth Century and After*, September, 1917.

of his own accord engages in battle without a reasonable certainty of success does not know his business. An attack of ships upon forts is an operation which naval writers regard as tabooed. It is an improper use of tools. It is employing ships for a purpose for which they are not suited. A ship is like an eggshell full of men and machinery ; a comparatively small number of hits by great projectiles will sink it, a sufficient number of explosions of smaller projectiles will cripple the machinery and disable the greater part of the crew. A ship offers a large, visible and vulnerable target. Fortifications on land are made to stand a great deal of pounding, even by heavy projectiles. A land battery offers a target only a few feet high, difficult to distinguish and very hard to hit. It may be hit a great many times without damage to the guns, which will probably be invisible and almost impossible to locate. Accordingly, the damage which may be inflicted on the fort is quite incommensurate with the loss which will probably be suffered by the ships. Common sense, therefore, suggests that the experiment should not be undertaken. Its most probable result is that a number of ships and men will be lost for nothing, and the consequence is likely to be not only defeat in the engagement but the loss of forces which might, had they been preserved, have turned the balance in some sea fight upon which the issue of the war possibly depends. The risk which ought not to be run is that of losing not only the battle but the war.

The attack by ships upon forts being forbidden by common sense, it seems incredible that any government should order such an operation. Yet this tabooed experiment was three times undertaken by the late government. The result of these and of subsequent operations was so disastrous that Parliament took the extraordinary step of passing an act which ordered a commission to inquire into the origin, inception and conduct of the operations in and about the Dardanelles, and which enjoined the publication of the commission's report. The first installment of the report had the effect of emphasizing the doubt in the public mind concerning the fitness of the organization of the government for the conduct of the war. But it did not relieve the doubt by the suggestion of a better system, so that the problem was not solved. The commissioners began their report by pointing out that they would exceed the scope of their functions if they were to examine the measures necessary to remedy the administrative defects revealed

by their inquiry. They ended it by the suggestion that any member of the public who might read the report should draw his own conclusions. This was probably the right course for a commission, which has neither the machinery of judicial procedure, inasmuch as those whose conduct is the subject of the inquiry are not represented by advocates, nor the peculiar kind of skill which is the qualification for scientific investigation. Moreover, the commission is still at work, and its report is far from complete. Yet what the nation needed and desired was to discover the defects in its system of government for the purpose of carrying on the war, and the remedy for those defects. I venture then to ask the reader to accompany me in accepting the commission's invitation to use the materials supplied in its report in an attempt to find out how the mistake came to be made, and how such mistakes can be prevented.

In every war all the important decisions are made by the supreme executive authority, which is responsible to the nation for them. It stands or falls by success or failure in war, naturally enough, for the nation stands or falls by the issue of a war, an issue for which it always holds its government responsible. Everyone else simply obeys the government. In our constitution the executive power, vested in the King, is exercised according to the advice of the Cabinet, and for that advice, which means for every act of each member and of all his subordinates, the Cabinet is responsible to Parliament. There are thus only two responsibilities, that of the Cabinet to Parliament, and of every official, including every single Minister, to the Cabinet. The decisions that fix the size of the army and navy, that determine how much of the army or navy shall be used in each theater of war, who shall command each portion, and what mission he is to fulfil, are decisions of the Cabinet as a body. But these decisions, taken together, constitute the conduct of the war. None of them is ever taken except with the sanction of the Cabinet, and if any of them were challenged in the House of Commons and condemned by that body the Cabinet would fall.

How, then, can a Cabinet rightly decide such technical questions as the number of battleships, or of divisions, to be kept, the choice of theaters of war, of objectives and of commanders, and the force to be placed under the orders of each of them? Just in the same way as a man decides his own affairs when they involve professional skill. He chooses a doctor, a surgeon, or a lawyer; listens to what the professional man proposes, and then decides to the best of his common sense whether he will take the medicine, consent to the operation on his child, or proceed with the action in chancery. The Cabinet in the same way considers the suggestions made by its generals or admirals, and decides to adopt, to reject, or to modify them. The members of the Cabinet have to make up their minds as best they can as to the skill of their naval and military

officers, and to back their judgment about them and their ideas by staking the national existence on the issue.²

The usual practice of a large committee is to have any important branch of its work prepared by a special sub-committee. When war broke out in August, 1914, the pre-existing arrangements had been thrown out of gear, partly by troubles arising out of Irish affairs, and partly because the principal military officers were told off to the expeditionary force which was sent to France. But new arrangements were quickly improvised, by which business connected with the conduct of the war was entrusted to two sub-committees. One of these, called the War Council, consisted of 12 members, of whom seven were members of the Cabinet, and the others were Mr. Balfour; the First Sea Lord, Lord Fisher; Admiral Sir Arthur Wilson; the chief of the Imperial General Staff, Sir James Wolfe Murray; and the Secretary, Lieutenant Colonel Sir Maurice Hankey. This War Council is perhaps not quite accurately described as a sub-committee of the Cabinet, because a minority of its members were not Cabinet Ministers. But for practical purposes the distinction does not matter. For the War Council the business was prepared by a small sub-committee, a triumvirate, composed of the Prime Minister, Mr. Asquith; the Secretary of State for War, Lord Kitchener; and the First Lord of the Admiralty, Mr. Churchill.

This triumvirate was a close approximation to the ideal arrangement for the management of a war. In 1892 Sir Charles Dilke and I, in an essay which represented the results of our joint study of "Imperial Defence," reached the conclusions that

the first requirement of a sound system is a general who can be entrusted with the duty of advising the Cabinet upon the conduct of war, and with the actual management of campaigns. To have such an officer is indispensable, for it is an elementary truth that war can never be well conducted by a committee. . . . Any satisfactory Admiralty system will provide a competent naval adviser for the Cabinet. . . . We attach the highest importance to the common action of the military and of the naval authorities in the consideration of Imperial defence. We doubt, however, whether it will be possible to secure unity of design in defence so long as the War Office and the Admiralty are separately represented in the Cabinet.³ The difficulty would be overcome if it became the practice for one Minister to hold both offices.

² *Westminster Gazette*, May 29, 1915.

³ This refers not to the professional advisers but to the political heads of the two existing offices.

Our great object was, if possible, to put before those who had charge of the national affairs a conception of defence which embodied views as to which there was full agreement between those who had devoted special attention to the subject. The passages just quoted proved to fulfil this condition, and in February, 1894, a memorandum was sent to the leading statesmen of all parties bearing the signatures, not only of the authors of "Imperial Defence," but also of General Sir George Chesney and Mr. Arnold-Forster, at that time the most eminent representatives in Parliament of the effort to induce the nation to make reasonable preparation for possible conflict. The substance of that memorandum was the following passage:

In order to secure the special consideration by the Cabinet of national defence as distinct from and superior to the administration either of the navy or of the army we would suggest the appointment of one and the same Minister to the two offices of Secretary of State for War and First Lord of the Admiralty, or the amalgamation, with the consent of Parliament, of these two offices.

We would further suggest that the Cabinet should select for each service an officer whose professional judgment commands its confidence, to be at once the responsible adviser of the Cabinet upon all questions regarding the conduct of war so far as his own service is concerned, and the principal executive officer of that service.

We understand by a responsible adviser one who stands or falls by the advice which he gives. He would, of course, have at his disposal, in the formation of his views, the best assistance which the professional staff of the navy or of the army could supply. But the opinion which, after mature consideration, he would submit to the Cabinet and formally record, would be his own, and would be given in his own name.⁴

The objects proposed by the authors of this paper were, first, that the Prime Minister himself should attend to the national business of the preparation and conduct of war and, secondly, to find some means of securing that the principles of war should be constantly kept before him.⁵ He was to have the best pro-

⁴ "Imperial Defence." 2d Edition. Appendix II.

⁵ I use the phrase "principles of war" because it was a favorite expression of Napoleon's throughout his career. Sometimes he spoke of the "high" or "sublime parts of war" and sometimes of "my system." Of all these terms the modern name is the theory of war. What the theory of war is and what service it can render to the nation I discussed in a lecture delivered at Oxford in February, 1916 (published under the title "The Way to Victory" by Messrs. Constable and Co.), to which I venture to refer readers interested in a subject which cannot be properly treated in the space here at my disposal.

fessional advice, of which the only possible meaning is that his advisers should be exponents of the principles or theory of war. Everything depended, of course, upon the distinctness with which each of these advisers should realize that his function was to be the representative of the theory, or, in other words, of the knowledge and experience of which the Great Staff, in the one case of the Admiralty, and in the other the War Office, must needs be the repository.

As a fact, the War Office and the Admiralty were in full possession of the theory and of its application to the problem of the Dardanelles, which was indeed familiar to all persons who had paid any special attention to the subject. The Dardanelles, the Bosphorus, and the Gallipoli Peninsula are among the famous places of the world, familiar to readers of history and travels. In 1807 a British fleet made its way through the Dardanelles past the forts, and reached Constantinople. There the admiral found himself unable to do anything against the city, and reluctantly made his way back through the Dardanelles, with heavy loss. In 1836 the Dardanelles were surveyed for the Sultan by a Prussian captain, von Moltke, who expressed the opinion that, if the forts were properly armed, no fleet could ever pass them, and that to land an army and take the forts in rear would be far from easy. This opinion was well known, for its author was afterwards the greatest general of the nineteenth century, and his account of the Dardanelles was published in a popular and widely read volume. In 1896 professional opinion on the subject was summed up as follows:

It would not be difficult to a civilized power so to fortify the Dardanelles that their passage by a hostile fleet would be impracticable, and that the works covering them would form a first-class fortress not to be taken, except after a protracted siege.*

In 1914 there was every probability that these fortifications had been put in order during one of the periods when the late Field Marshal von der Goltz was a pasha supervising the Turkish Army. At the end of 1914 there was a further probability that the attention of the Turkish Government had been specially directed to these forts by the brief bombardment of the outer forts carried out on the 3d of November under orders from the Admiralty given without the knowledge of the War Council.

* *National Review*, November, 1896.

In quite recent times the War Office and the Admiralty had more than once caused the problem of forcing the passage of the Dardanelles to be carefully studied. In 1904 Lord Fisher satisfied himself "that even with military co-operation the operation was mightily hazardous." In 1906 the General Staff at the War Office reported that "military opinion, looking at the question from the point of view of coast defence, will be in entire agreement with the naval view that unaided action by the fleet, bearing in mind the risks involved, is much to be deprecated." In September, 1914, Mr. Churchill, as First Lord of the Admiralty, ordered, with Lord Kitchener, that two naval and two military officers should work out a plan for seizing the Gallipoli Peninsula (with a Greek army) in order to admit a British fleet into the Sea of Marmora. A day or two later he received a military memorandum saying, "An attack upon the Gallipoli Peninsula from the sea side (outside of the Straits) is likely to prove an extremely difficult operation."

Thus, the two offices concerned had fulfilled their function of applying the theory of war to the particular problem with which we are concerned. The War Council appears to have been not quite so happy. In December, 1914, its Secretary circulated to the members of the War Council a memorandum, in which it was suggested that there was a deadlock in the western theater of war, and that Germany could best be struck by a blow directed in the first instance against Turkey. The report of the commission tells us that at this time the members of the War Council, apparently the professional members, were divided into two schools, one of which held that all efforts should be concentrated in the western theater of war, at any rate until it was proved beyond doubt that there was there no possibility of success, while the other held that a fresh campaign should be opened against Turkey and Austria. There can hardly be a doubt as to which of these two schools was inspired by the theory of war. Napoleon, writing at St. Helena about the campaign of 1800, said:

A plan of campaign ought to have foreseen all that the enemy can do and contain the means of frustrating it. In this campaign the frontier of Germany was the predominant frontier; the frontier of the Riviera of Genoa was the secondary frontier. The events which might happen in Italy would have no direct, immediate, and necessary action upon the affairs of the Rhine, while the events that might happen in Germany would have a necessary and immediate action upon Italy. Consequently,

the First Consul united all the forces of the Republic on the predominant frontier.

In January, 1915, not only was the western front the predominant frontier, but it was the only frontier upon which all the forces of France and England could be united. The proposal for operations on a large scale through Turkey, attributed by Lord Fisher to Sir Maurice Hankey, and, apparently, favored by Lord Fisher himself, violated the first principle of war, which is to concentrate all efforts both in time and place.

At the beginning of 1915 the German assaults in the west had been checked. Their great attacks on Ypres had failed. But the new armies which were forming in England had not yet taken the field. In the east the Russians had the better of the Austrians, but were not doing well on the Asiatic frontier of Turkey. Bulgaria was neutral, and there was reasonable uneasiness about her possible attitude.

The bombardment of the forts of the Dardanelles was begun on the 19th of February. It was authorized by the Cabinet on the 17th or 18th of February, when "the Prime Minister conveyed to the Cabinet the unanimous decision of the War Council. It was accepted by them without question, criticism, or discussion of any kind." The decision of the War Council which the Cabinet thus endorsed without question was formed at two meetings. The first was held on the 13th of January. On this occasion

Mr. Churchill said that he had exchanged telegrams with Vice Admiral Carden, the commander-in-chief in the Mediterranean, in regard to the possibilities of a naval attack on the Dardanelles. The sense of Admiral Carden's reply was that it was impossible to rush the Dardanelles, but that in his opinion it might be possible to demolish the forts one by one. His proposal was first to concentrate his fire on the entrance forts. After they were demolished he would proceed to deal with the inner forts, then attack from the Straits and from the sea side of the Gallipoli Peninsula. The plan was based on the fact that the Dardanelles forts are armed mainly with old guns of only 35 caliber. These would be outranged by the guns of the ships, which would effect their object without going into range.

Mr. Churchill gave details of the force to be employed, and went on:

The Admiralty were studying the question, and believed that a plan could be made for systematically reducing all the forts within a few weeks. Once the forts were reduced the mine fields would be cleared, and the fleet would proceed up to Constantinople and destroy the *Goeben*.

Lord Kitchener thought the plan was worth trying. We could leave off the bombardment if it did not prove effective.

There was, apparently, no other speech. Lord Fisher, Sir Arthur Wilson, and Sir James Murray remained silent, and the decision was taken in the following terms: "The Admiralty should prepare for a naval expedition in February to bombard and take the Gallipoli Peninsula, with Constantinople as its objective."

The second meeting of the War Council was held on the 28th of January. The decision taken was identical with that adopted at the first meeting. So far as can be gathered from Sir Maurice Hankey's note, of which one version appears in the commission's report, and further details in that of Mr. Roch, Mr. Churchill advocated and Lord Kitchener supported the measure proposed. The arguments used are recorded as follows:

Among the advantages claimed for it were that

- (1) It would cut the Turkish Army in two.
- (2) It would put Constantinople under our control.
- (3) It would finally settle the attitude of Bulgaria and the whole of the Balkans. (This appears to have been said by Lord Grey.)
- (4) It would give us the advantage of having the Russian wheat, enabling Russia to resume exports (this would restore Russian exchanges which were falling owing to her inability to export, and causing great embarrassment).
- (5) It would open a passage to the Danube.
- (6) If successful, its effect would be equivalent to that of a successful campaign fought with the new armies.
- (7) One merit of the scheme was that if satisfactory progress was not made the attack could be broken off.

Mr. Balfour, in dwelling upon the advantages which would accrue from a successful attack on the Dardanelles, concluded by saying that "it was difficult to imagine a more helpful operation." Mr. Churchill then said that the naval commander-in-chief in the Mediterranean had expressed his belief that it could be done. He required from three weeks to a month to accomplish it. The necessary ships were already on their way to the Dardanelles. The real difficulties would begin when the outer forts had been silenced, and it became necessary to attack the Narrows. . . . He explained the plan of attack on a map.

Nothing more was said relevant to the operation. The project was not criticized, and all the naval officers were silent.

It is quite intelligible that those members of the council who had had no training in the science and art of war should be impressed with what was said at these meetings. Mr. Churchill's speech on the 13th, giving the views of Vice Admiral Carden, must have seemed, in the silence of the admirals present, to represent the professional opinion of the navy. There was no one to tell the council that the notion of the naval guns demolishing the forts while out of range of them was in flat contradiction to the views of coast-defence officers, which seem to have been represented in the War Office paper of 1906. The silence of the admirals was taken to imply approval, and rightly so, for all the non-professional members had been members of the Committee of Imperial Defence, where it was well understood that the silence of a naval or military officer implied concurrence with the view expressed by his political chief. The political members might perhaps discount Mr. Churchill as one of their own class. But he appeared to be speaking for the Admiralty and to represent the naval judgment; above all he was warmly supported by Lord Kitchener, whose force of character and great reputation lent immense weight to whatever he said. Thus the plan was carried without criticism, and no one seems to have noticed that of the seven advantages claimed the seventh was not very promising, and the other six were chickens that could hardly be hatched before the taking of Constantinople, a feat that no one can have thought likely to be accomplished without an army. The naval officers who were present have subsequently been examined by the commission and have excused their silence on the ground that it was not their duty to express disagreement with the First Lord of the Admiralty. But in that case what was the use of their presence? What was its object if not to ensure that the theory of naval war in its application to the plan proposed should be brought home to the political members? What escape have they from the dilemma that either they had not mastered the subject, or, if they had, had sat silent while a wrong decision was made?

The moral to be drawn from these two meetings is that the direction of the naval and military forces of the Crown cannot safely be left to a committee of political leaders, however distinguished, without an adequate guarantee that before they make a decision they will have had before them an analysis based upon a sound theory of war, naval or military.

It remains to examine the working of the triumvirate, in which the Prime Minister's function was to keep his mind open to the military and naval judgment of which the Secretary of State for War and the First Lord of the Admiralty were the official exponents. The cases of these two officers were not identical. Mr. Churchill, not being a naval officer, could have no judgment of his own on naval matters entitling him to a voice in the council. His proper function was to be the mouthpiece of the Admiralty. The organization of the Admiralty had, since 1894, been modified for the purpose of securing sound strategical advice to the government, and the order in council regulating its business had added to the other duties of the First Sea Lord the function of strategical adviser to the government. He had subsequently been provided with a special staff to assist him in the performance of this function. These arrangements imply a specific and formal mode of procedure. If they meant anything it was that naval opinion should be ascertained, formulated and transmitted to the First Lord by the First Sea Lord and by no one else. He might ask for or receive help from his subordinates and call upon them for information or opinions. But every paper would pass through his hands, and if forwarded by him to the First Lord would bear his endorsement. For the purpose of the war the Board of Admiralty was superseded by a "War Staff group," of which the First Sea Lord was the professional head. Indeed, Lord Fisher's authority at the Admiralty was so strong as to amount to a dictatorship against which a protest was afterwards made by the other Sea Lords.

Yet the commission's report reveals Mr. Churchill directly obtaining opinions from a number of Lord Fisher's subordinates and taking just so much of them as suited his own views. No one who reads the commission's report can doubt that, so far from trying to ascertain what the best naval opinion was, Mr. Churchill exerted himself to obtain opinions favorable to his plan and to make the most of them. Sir Henry Jackson, for example, agreed with the proposal for an experimental bombardment of the outer forts, but did not wish to go further until the results of this attempt were seen. He deprecated any attack on Constantinople by the fleet. His was one of the judgments considered by Mr. Churchill as favorable to the project, but it certainly did not justify an operation "with Constantinople for its objective."

It is well within the mark to say that Mr. Churchill was not a channel through which the naval judgment could reach the Prime Minister undistorted.

The official position of the Secretary of State for War had long been that of a channel between the military judgment of the War Office and the Cabinet. For many decades the Secretary of State had been a purely political personage, and the War Office was reorganized in 1904 in order to provide him with a strategical adviser, the Chief of the Imperial General Staff, assisted by a special subordinate, the Director of Operations. But the appointment of Lord Kitchener made an end of this system. Lord Kitchener had the rare distinction of "being himself, alone." The opinions he expressed were his own; they were not representative. During an active career he had been occupied chiefly in administration, for the most part in the east, so that he was unfamiliar with British institutions at home, with the modern organization of the War Office and the army and with the Territorial Force, which he mistakenly treated as inferior to levies which were raised under the name of "new regulars," so that the unique opportunity of embodying all the forces into a homogeneous army was lost. He had never been a great student of war, and his experience in the field was confined to the African campaigns in which he made his name. His views were those of a shrewd good sense little tinged by science, theory or system. The commission was told that he "acted as his own Chief of Staff"; in other words, he ignored the War Office except as the instrument of his wishes. Thus he was the last man to convey to the Prime Minister the information or the military opinions that had during 10 years of devoted work been accumulated by the General Staff at the War Office. Sir James Wolfe Murray, in January, 1915, Chief of the General Staff, had held that office for only a few months and could not be in a position to express opinions independently of such a Secretary of State as Lord Kitchener. Lord Kitchener's share in the purely naval attack on the Dardanelles can be briefly told. On the 2d of January, 1915, a telegram was received from Petrograd asking for a demonstration to draw off the Turks from the Caucasus. Lord Kitchener saw Mr. Churchill and sent him a note saying:

I do not see that we can do anything that will seriously help the Russians in the Caucasus. . . . We have no troops to land anywhere.

. . . . The only place that a demonstration might have some effect would be the Dardanelles.

Next day Lord Kitchener telegraphed through the Foreign Office a reply to Petrograd promising that a demonstration would be made. Lord Kitchener's attitude at the War Council has been described and it is evident that his opinion favorable to the plan made a strong impression on the Prime Minister. But light is thrown upon his position by a paper which he read to the War Council in May, 1915:

When the Admiralty proposed to force the passage of the Dardanelles by means of the fleet alone, I doubted whether the attempt would succeed, but was led to believe it possible by the First Lord's statements of the power of the *Queen Elizabeth* and the Admiralty Staff papers showing how the operation was to be conducted. . . . I regret that I was led to agree to the enterprise by the statements made, particularly as to the powers of the *Queen Elizabeth*, of which I had no means of judging.

But the Secretary of State for War had every means of judging whether the *Queen Elizabeth's* or any other ship's guns could alter the conditions of naval attack on forts, especially in the narrow channel of the Dardanelles. The papers existing in the War Office, to which reference has already been made, gave him all the means needed.

My endeavor has been to find out the exact nature of a failure in the work of a government. That has involved an examination of the action of distinguished men. But it is not hostile criticism. Each of us is here to serve his country to the best of his powers. The difficulty is that the ablest men are the most overworked. While Lord Kitchener and Mr. Churchill were advising the Prime Minister about the operations of the war, each of them was also general manager of one of the largest business concerns in the world, which was expanding at an unprecedented rate. Besides that, each of them was a member of Parliament and of the Cabinet. Neither could give more than a fraction of his time to the close study of the operations of the war. Lord Fisher, as First Sea Lord, had a responsibility for a large part of the business of the Admiralty. The first condition of a clear strategical judgment is that a man must concentrate himself upon the direction of the operations to the exclusion of everything else. He must be free from other cares. Before we censure the men who have had to take the responsibility for ordering campaigns and battles by sea or land, let each of us try to imagine himself in their place. War

cannot be conducted except by men of strong will, nor without mistakes, and it has been well said that those who are afraid of the mistakes they may make never do anything. In the same way, however, those who are afraid of criticizing when the object is to find the truth may be diverted from their path. So I return to my inquiry.

I have said that the attack of ships upon forts is contrary to common sense. This statement perhaps requires modification. What common sense tells us is that the government in directing the naval and military operations must conform to, and not violate, the principles of war. But common sense unaided does not tell us what those principles are. When a portion of the fleet was ordered to bombard the forts of the Dardanelles, Mr. Asquith did not know, and Mr. Balfour did not know, that a principle was being violated. No voice was raised in the War Council to say: "What you propose to do runs counter to all the experience of wars, and everyone who knows thoroughly what can be done with ships, guns and earthworks, will tell you that ships are not made to fight earthworks, and that you are making an experiment which is morally certain to end in disaster." The defect in the system was that, in the various bodies which one after another discussed this plan until it was finally adopted, there was no one who possessed such a knowledge of what ships, guns, earthworks and men can and cannot do, under given conditions, and of the experience of past wars, as to be able to say, "This operation is a wrong use of forces, and the whole history of modern war is a warning against it," and who combined with this knowledge and the judgment resulting from it, the official and unmistakable duty of pressing that judgment upon the committee of which he was a member. If the country is to have any security that the best use will be made of the forces which, at so much sacrifice, have been placed at the disposal of the government, if it is to have a guarantee that its men, its money, and its ships will not again be thrown away in vain, either in parts or entirely, means must be taken to ensure that, before the government issues instruction either to the army or the navy, the orders proposed shall have been submitted to the scrutiny and shall have obtained the approval of someone who is master of the principles of war.

The remedial measure by which the required guarantee can be secured is not far to seek. It has been set forth in the course

of my argument and consists in adopting the principles about which there was agreement in 1894 between those who had then long examined this problem as the vital part of any national organization for war. Sir Charles Dilke, Sir George Chesney and Mr. Arnold-Forster have long been dead, as have most of those eminent naval and military officers, such as Admiral Hornby, Lord Wolseley, Lord Roberts, Colonel Charles Brackenbury, General Sir Henry Brackenbury, and General Sir Frederic Maurice, with whom we repeatedly discussed these subjects, and who, we believed, were in substantial agreement with us regarding the matters now in question, though we did not think that it accorded with the best traditions of the discipline of the services that we should seek the signature to our manifesto of any officers on the active list. It seems to me a duty not only to those who are now fighting for the country, but also especially to those with whom for many years I was closely associated in the effort to induce our statesmen to set in order the machinery of government for the conduct of war, to recall and to apply to that momentous business principles which we were agreed in recognizing as sound, and which, so far as I am aware, have never been questioned by those whose knowledge and experience gave weight to their opinion. Many years ago I endeavored to work out with as much exactitude as possible the application of these principles, first to the army, and afterwards to the navy.⁷

More than one step since then taken by successive governments was in the right direction. The creation at the War Office of a General Staff, whose chief was to be the strategical adviser of the government, and the modification of the order in council regulating the duties of the Board of Admiralty, by which the First Sea Lord was given the duty of naval strategical adviser, were approximations towards a sound method. But in each case a serious error was committed, of which it is indispensable to point out the nature. The essence of great achievement in all the higher branches of action, especially of intellectual action, is division of labor, with a view to concentration of effort. This is the basis of all good organization, both of knowledge or thought, and of action. The theory, art or science of the general direction of armies or navies in war, the science or art which is called strategy, is in its practical application one of the most difficult in the world. To master it is

⁷ "The Brain of an Army," 1890; "The Brain of the Navy," 1894.

a life's effort, to apply it an all-absorbing occupation, requiring a mind as far as possible freed from other preoccupations. The man who undertakes it must be wholly devoted to it, so as to have leisure to throw his whole soul into it. He must be free from the distracting influence of irrelevant interruptions. Strategy must be his profession, for it is not a mere abstract science, it involves the application of the practical judgment, of faculties of which the full development requires action. For the fundamental impulse of the strategist is to design operations and to direct them. His mission is not administrative but executive, and in order that his execution may be as perfect as possible, he must be free from the absorbing and distracting cares of administration. The military and naval life of 99 officers out of 100 gives them neither the opportunity of practicing strategy nor the leisure to study it. The man who gives words of command to a battalion or to the officers of a ship is not practicing strategy, and as a rule has nothing to do with it. It is the constant experience of military historians and of governments that an officer who is a brilliant leader of a brigade or of a division may prove utterly incapable of the responsibility of command-in-chief, and of the two greatest generals of modern times, Napoleon and Moltke, it is almost literally true to say that neither of them ever gave a word of command in his life. When the office of Chief of the General Staff was created, its holder was made First Military Member of the Army Council, and was thus the professional head of the board which administers the army. In this way he was placed at the same time at the head of two distinct professions, that of the strategist and that of the military administrator. But no man can serve two masters, and there is no escape from the dilemma that the Chief of the General Staff may be either a first-rate administrator or a first-rate strategist, but that it is hardly possible that he can be both at once.

When the duty of strategical advice was given to the First Sea Lord, that officer was the professional head of the whole naval administration. He was the senior member of the Board of Admiralty, and all important questions arising in the departments of his colleagues were submitted to him. Upon this more than sufficient mass of business was superimposed the function of the strategist. The dilemma in which the Chief of the General Staff is fixed is imposed also upon the First Sea Lord. Moreover, the

fact that in each case two activities of a totally distinct nature are required from a single officer makes it difficult rightly to select an officer for the post. Is he to be chosen for administrative gifts or for strategic judgment? In the one case, naval or military administration, in the other, the direction of the army or navy in war will suffer. In peace, every government regards the administration as of primary importance, because the first care of a government in peace is apt to be to satisfy the House of Commons that there is no extravagance in expenditure. But in war, a nation's first need is victory, and both the design of victory and the supervision of the execution of that design are functions not of the administrator but of the strategist.

What is required is the selection for each service of an officer whose duties would be, subject to the higher authority of the Prime Minister, to draft and to issue the orders of the government to all the generals or to all the admirals entrusted with the command of fleets or armies. His duty would be to submit his plans to the Prime Minister, and through him to the Cabinet, to translate them into orders and to issue those orders. His title matters little. I think the simplest would be that of Director General of Military or of Naval Operations. He would be chosen for his strategical judgment, his mastery of the theory and practice of naval or of military operations. His occupation would be with those operations and nothing else; with the naval or military administration he would have no direct concern. He should have his own office, into which he should remove those branches of the existing War Office or Admiralty which, under the name of General Staff, have to do with the operations of the navy or of the army. He should be subject to no First Lord of the Admiralty or Minister of War, but should be in direct relation with the Prime Minister and the Cabinet. The administration of the two services would be left to the Admiralty and the War Office, each of them under an administrative officer or board, and if need be, under a Cabinet Minister, as at present. The two directors general should have their offices near to one another, so that they could readily communicate with each other.

There should be no intermediary between them and the Prime Minister. The secretariat of the Committee of Imperial Defence was instituted in 1904, with the idea that the secretary should consider all questions of defence and furnish advice. That is the

attempt to create a hybrid, a strategist who shall be at the same time a master of land and sea warfare. It is a dangerous and doubtful experiment, of which the result can only be a new dilemma. The secretary will either be a mere clerk, or he will dominate both the services, conducting the war and governing the country. In the second case it would be better that he should at once be appointed Prime Minister.

I am well aware that the objection will be raised that it is difficult to find men of the character and qualifications required for the direction of the naval and military operations. If that were true, the British Empire would be in a bad way. My answer to it is: "Seek and ye shall find," and that if in the past mistakes in the choice of men have been made, the explanation may be that those with whom the choice lay were not quite clear as to the exact nature of the qualifications needed.

The question as to the precise relations of the directors of naval and military operations to the supreme political authority of the Cabinet is perhaps delicate. On that point I am not acquainted with any discussion in the English literature of war. My own view that the military strategist should himself be a member of the government was expressed in December, 1899, on the eve of those disasters in South Africa which so startled the nation as to gain for the period when they happened the name of the Black Week. On the 14th of December I wrote:⁸

A nation that is liable to war requires men of war in its government; and, in the case of Great Britain, the place for them is in the Cabinet. The traditional practice of having a civilian Minister inside the Cabinet with all the authority, and a soldier with all the knowledge outside the Cabinet, was devised for electioneering purposes, and not for war. The plan has answered its object very well for many years, having secured Cabinets against any intrusion of military wisdom upon their domestic party felicity. But now that the times have changed, and that the chief business of a Cabinet is to manage a war, it seems unwise to keep the military judgment locked out. Party felicity was valuable some years ago when there was a demand for it; but the fashions have changed. To-day the article in demand is not eloquence nor the infallibility of "our side," whichever that may be; the article in demand to-day is the organization of victory. That is not to be had at all the shops. Those who can supply it are very special men, who must be found and their price paid. The nation has given bail for the production of this particular article, and if it is not forthcoming in time the forfeit must be paid. The bail is the British Empire.

⁸ "Lessons of the War" (Constable, 1900), p. 93.

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FORECASTS AND REALITY IN THE NAVAL WAR¹

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I. NAVAL DELUSIONS

The War of the Nations gives the outward impression of a revolution rather than an evolution in methods of naval warfare. To speak frankly, the impression seems widely current among people of intelligence that the war has quite discredited the science of naval warfare as propounded prior to 1914; while a large part of the general public are persuaded that it has demonstrated the failure of navies. One of the advantages supposedly inherent in sea power was the ability to transport troops to strike the enemy at his most vulnerable points. If the Dardanelles campaign had succeeded it would indeed have constituted a most obvious proof of the direct influence of sea power upon the course of the war; on the other hand, a superficial examination of the actual situation might appear to justify the opinion expressed several years ago by one of our army writers in confuting the well-known book by Callwell: "Sea power, while often useful, may sometimes be harmful, leading to erroneous diversion and useless scattering of land forces." Notwithstanding the enormous superiority of the Allied fleets over those of our adversaries, the former cannot count to their credit any striking and conspicuous achievements, which may be confidently proclaimed as notable contributions toward the attainment of our objectives in the war. If the inability of Germany to hold her colonies must be conceded as due to naval power, still it is always possible to apply the words of Napoleon in an analogous situation: "Pondicherry may be reconquered on the banks of the Vistula."

Two fundamental advantages accruing to the Allies from preponderance of sea power are the absolute interdiction of enemy

¹ From the *Rivista Marittima*, August, 1917.

trade and the maintenance of our own maritime communications, making it possible to continue the struggle as long as necessary, with land forces steadily augmented, and to carry supplies wherever needed, until in the end we may impose our will on the enemy.

The sceptic will suggest, however, that while the first of these advantages undoubtedly bears heavily upon our adversary, its ultimate efficacy must not be exaggerated. Mahan, in the introduction of his classic work on *The Influence of Sea Power*, in order to demonstrate the effect of cutting off the sea trade of a country in which it is intensively developed, cites, as a typical example, Holland in the disastrous 18 months' war with England in 1653-54; the Zuyder Zee became a forest of masts, the land was reduced to dire misery, and Holland was constrained to a ruinous peace. But it will not do to compare Holland with the great Central Powers, rich in resources of all kinds, and strengthened, moreover, in their capacity for resistance by the occupation of important territories and by their Balkan alliances, creating, in spite of the efforts of Allied forces to break the cordon, a complex of peoples stretching from the North Sea and the Baltic to Mesopotamia.

Scepticism is evidently less justified in regard to the second advantage, that conferred upon the Allies by the maintenance of sea communications, which is for us a factor of absolutely vital importance; but it may be asserted that the means employed to protect sea trade have not measured up to the needs. Clearing the seas of isolated German cruisers and destroying at the Falklands the squadron victorious at Coronel, were indeed tangible proofs of naval superiority; but it will doubtless be said that Germany's failure here was due to the fact that in the initial phase of the war she clung to old principles, and did not, during the first seven months, have recourse to the submarine in commerce warfare.

At all events, note the way the submarine scythe has cut into the line of transports. Recent losses are indeed somewhat less than at the opening of the unrestricted U-boat campaign; transportation is now controlled to secure maximum efficiency; measures and systems of protection are steadily becoming more logical and effective; the munitions output is constantly increasing; the United States has entered the field; admitting, as we have reason to presume, that the combined effects of these measures will assure to the Entente the tonnage necessary to make up for future losses

and guarantee the prosecution of war to victory—nevertheless, judging from appearances, it would be foolish to say that in taking measures of the kind noted above the navy has played the part of protagonist in the war. The antidote for the submarine has not yet been found; protection of sea routes against the insidious foe is secured essentially by grouping in convoys, arming of merchant vessels, and escort. And, as regards this last point, it will be said that escort of merchant vessels by torpedo craft, however numerous, has a practical value somewhat like that of moral character in human affairs; while the submarine is forced to submerge, it will be asserted that it is seldom seen in time to prevent effective maneuvering for torpedo attack.

Submarine attack on communications appears, among the various kinds of naval activity, the only one that has had a direct effect upon the course of the war; and, in contrast with the very tangible way in which its work is manifested, it is difficult to appreciate the effectiveness of counter-measures.

People in the Allied countries note that the maintenance of an immense patrol force of all types requires unceasing labor, extremely fatiguing and dangerous, treachery thwarted, enemy attacks warded off, mines destroyed, unremitting vigils in home and enemy waters, difficulties hampering all these activities—and the actual accomplishments often unknown and their value unappreciated.

If we turn to consider the work of the navies as manifested in fleet actions, no one will deny that in size Jutland was the greatest naval battle in history. But the objective of the German fleet in putting to sea is still wrapped in mystery, and both sides claim tactical victory, while the ultimate effect of the sanguinary conflict upon the course of the war does not readily appear.

We have now touched upon the principal aspects of the present naval war.

Many valuable ships have been lost, through treachery, through defeat, and sometimes as a result of actions that have worked little harm to the enemy. Great is the activity of patrol boats, torpedo craft, and scouts; yet the submarine still scores frequent victims.

The submarine and the mine, if they have not paralyzed the main fleets, have still forced them to remain normally in ports well protected by nets and barriers, so that in this war their character-

istic employment seems to be *inaction*; the naval engagements have been most sanguinary, but seemingly sterile.

How can we compare this warfare with what we imagined before 1914? The logical answer seems to be that of a German writer after the first few months of war: "If we consider what has happened on the sea, we cannot suppress an ironic smile at the predictions of naval strategy; fundamental principles are overthrown, every theoretical forecast is vanity, and the totally unforeseen has become reality."

The more justified seems this irony when we reflect that while Germany herself, in her miraculous preparation for war, gave considerable attention to the development of the submarine, this development was slight as compared with what has taken place during hostilities, whether in respect to numbers, scope, or field of action. The vast submarine campaign is itself one of the improvisations of the war.

After having devoted to the fleet so large a part of our national revenues, we discover it to be a veritable delusion, or we are forced to acknowledge that means which are relatively more effective are far cheaper, *i. e.*, submarines, mines, swift torpedo craft and air-planes. Battle squadrons, in fact, might almost seem organisms tolerated merely because they exist; though in reality it is always easy to see the matter in a very different light simply by reflecting that, held in a potential state at opportune strategic points, *these squadrons serve, if in no other way, to paralyze those of the enemy, which, without the equilibrium thus established, would presumably not rest innocuous.*

While recognizing the validity of this fundamental axiom, if for no other reason than to exclude the paradoxical concept that battleships are useless, there are those who would employ it in order to draw therefrom an apparently brilliant corollary for "after the war."

Their idea is as follows: Admitting that battle fleets are necessary to offset each other, it will be seen that if no battle fleets existed, precisely the present equilibrium would still obtain. Thus, for the future, there rises the mirage of an international convention, forbidding the construction of ships-of-the-line, while leaving nations free to provide for their naval defence by other means. The mirage is most seductive, since it seems to lead by a reasonable step toward the utopia of complete disarmament.

Let us see if this idea is acceptable.

I have sought to present as logically and impartially as possible the arguments suggested by this delusion in regard to naval power; these arguments should be discussed; if their fallacy is demonstrated, they should be cast aside, lest they lead us into evil.

I shall limit myself to a few general considerations, which seem sufficient to prove that the actual effects of naval superiority are greater than appearances indicate, and sufficient also for a summary examination of the changes brought about by the war in the light of prior predictions.

II. THE CHARACTER OF THE WAR

What is the opinion of well-informed critics as to the naval action of Germany at the outbreak of war? Were the German naval objectives realized?

The First Lord of the British Admiralty stated in the House of Commons, in November, 1914, that at the opening of hostilities, England was in grave peril; "and the greatest danger was that of being surprised unprepared, with the fleet not disposed in readiness for war." Once the fleet was mobilized and properly stationed, the danger was over.

These words were not exaggerated.

At the beginning of the war (as to-day) the German fleet was considerably inferior to the British fleet in home waters; but it should not be forgotten that the quota of forces held in complete readiness in time of peace modified this difference in a sense favorable to Germany. In other words, Germany held a larger part of her fleet in permanent preparation for war; and a war opened by a surprise naval attack on her part offered better prospect of success than could be expected later on.

It is beyond question that this surprise action, the possibility of which constituted the chief preoccupation of the British, might have had serious results; aside from other considerations, now that we are in a position to appreciate the unforeseen and extraordinary contribution of England to the land war, who will lightly affirm that nothing would be different in this respect if a great naval battle had at the start transposed the relative strength of the two chief fleets?

The great naval surprise was not attempted by Germany, not certainly because of unwillingness (for it would have accorded perfectly with her spirit and interests) but because of its impossibility, owing to the fact that on the very day of Austria-Hungary's *ultimatum* to Serbia the British Navy had carried out a complete practice mobilization, and could equip her reserve and dispose her squadrons before the outbreak of war. The weight of British naval superiority thus thrown on the scales of war, Germany was forced to avoid risking her main fleet under adverse conditions, and must await the outcome of events, seeking in the meanwhile to weaken her opponent by vigorous attacks on her navy and sea communications—"neglecting nothing," as Bernhardt wrote in 1913 (*Germany and the Next War*), "which might in any wise injure the enemy, accompanying the most ardent initiative by the boldest offensive." And this period of waiting, according to the author just cited, would continue until "at last we shall be able to challenge Great Britain on the high seas." (We shall take up later the prospect of a great naval engagement in the course of the war.)

The consequences, as we have just outlined them, which followed the prevention of aggressive naval action on the part of Germany, are in harmony with the rapid decision sought by the German armies on the western front. The battle of the Marne stopped the German invasion; but, contributing to this result, an event of not less importance was the establishment of British naval superiority in its complete efficiency, it being clear that without an initial naval situation favorable to England "the transport of troops to the Continent," according to the statement of the First Lord in the speech already cited, "would have been prevented or at least retarded"—and every one knows there was no time to lose.

From a naval standpoint, the situation of the Central Powers is exceptional; their coasts, of slight extent, are by nature and art invulnerable. *For a war of attrition, the conditions presented were ideal*; the German and Austro-Hungarian fleets had a freedom of action which it would be folly to assume in similar cases for nations very differently exposed to naval attack. Whatever their inferiority to the enemy, the problems presented to these fleets were of a purely aggressive character—it was possible for

them to run no risks and remain safely passive until the opportune moment for action. It is essential to take account of this special situation in order to appreciate the labor of the Allied fleets in the war, and *to avoid generalizations that would be completely absurd.*

The moment past when, prior to or at the outbreak of war, the German fleet might have attempted a surprise, it remained for the Allied navies to blockade the enemy fleets in the North Sea and Adriatic, capture isolated enemy vessels elsewhere, and profit by the liberty of action thus secured.

Upon the failure of the German plan for a quick decision on land, the war became long and severe; and as an effect of its increased length, the influence of naval superiority took on a value it would not otherwise have had.

In ante-bellum discussions of the effect of sea power in a possible war between the Entente Powers and the Triple Alliance, naval writers as a rule spoke too abstractly of the advantages to be derived from control of the sea; military critics correctly pointed out that these advantages would be felt only in a long war. What importance could be attributed to the isolation of the enemy from the rest of the world in a war of from two to six months?

At the maximum, the war was not expected to last more than a year. "Opinions as to the duration of the war," I find in an important work by a French writer (Captain Sorb, *La doctrine de defense nationale*, 1912), "are divided; some say the campaign cannot be ended in less than six months; other say a year; but we believe that a period of about a month will bring a decisive action, with irremediable consequences, and two months will see the situation definitely under control."

The above is cited, not from a desire to demonstrate the error of those who anticipated a short war, but simply to bring out in striking relief the discrepancy between expectations and reality as to the duration of the conflict. And what is the explanation?

Preventing the effort to separate the Entente armies at the opening of the war, sea power has enabled the Allies to increase their forces steadily, and to put in the field armies still untrained or in process of creation. To sea power also is due the fact that what Germany regarded as "the centrifugal tendencies of the heterogeneous British Empire" have been transmuted into fra-

ternal co-operation on the battlefields of Europe; and that to-day four-fifths of the world are at war with the German Empire; and finally we owe it also to the same cause that defeated armies have been saved and placed again in the field, that grave errors have been remedied, and that to-day, in spite of the tremendous upheaval in Russia, we are keeping up the war as energetically as possible, with firmest faith in the victory of our armies, and with new cards of the highest value still to put in play.

All this has been accomplished in the face of enemy efforts to thwart our free use of the sea.

In the first months of the war the destruction of commerce was kept quite within foreseen limits, in spite of the desperate assaults of enemy cruisers. "We had assumed," said Mr. Churchill, "a loss of 5 per cent of our merchant marine in the first two or three months; instead I am glad to be able to state that the losses have reached only 1.9 per cent."

When her ships designed for commerce warfare were destroyed, Germany had recourse to submarines.

In harmony with this method of attack on British commerce was the vigorous offensive toward Calais undertaken by the right wing of the German army (Oct. 17–Nov. 9, 1914), the failure of which, incidentally, was greatly assisted by British monitors hindering the movement of enemy troops along the coast and supporting the left flank of the Belgian army. Thwarted in its effort to control the southern side of the Channel, Germany made effective use of her strip of Belgian coast by establishing naval bases at Bruges and Seebrugge, the importance of which is fully recognized.

The land and sea strategy of the enemy are thus seen to have been in close correlation, such as can scarcely be said to have existed on the side of the Allies. For instance, it would have been a good example of the decisive influence of sea power on the course of the war if the Allies had found it possible, before the conquest of Serbia, to move an army from the east coast of the Adriatic to block the way to Turkey. But at that time the Allies were still far from the concept of a united front, of one war whether by sea or land, and of utilizing sea communications to checkmate the advantage of central position. The example cited is purely hypothetical, presenting obstacles which prevented its

adoption; but it may serve to fix the idea of the importance of naval supremacy as a means of carrying the attack into favorable fields; nor is it logical to depreciate this importance on the basis of the failure at the Dardanelles and the inactivity at Saloniki.

The fact remains that, in spite of the work of the submarines, an immense number of troops have been, and undoubtedly will be, transported by sea with minimum losses. Convoys with units of fair speed and adequate escort have comparatively little to fear. The heavy losses have been among the cargo carriers, making the problem here more difficult.

It is true there are reassuring signs. The losses are diminishing, in spite of the increased number of ships engaged in European traffic owing to the American alliance. The severe losses at the opening of the unrestricted campaign are not likely to be repeated, since they corresponded to a different control of traffic from that now in force, and to the combined action of all enemy submarines, the units of which must now take turns in port for supplies and refitting. The counter-measures of various kinds now employed indicate that the day is still far distant when the submarine may be said to have rendered powerless the Allied armies. The final adoption of the logical system of convoys has enabled the navies to increase their direct protection. And this will be still further increased with the application, even fuller than hitherto, of the principle of a united front and absolute community of interests.

Nevertheless, I repeat it would be absurd to deny the serious menace of the submarine; and the question may be logically asked whether, viewing the whole situation, this system of warfare has produced the results expected by the Central Empires.

In undertaking the submarine campaign, and pushing it to its extreme limit, the Central Powers virtually declared war on neutrals. While thus likely to increase the number of enemies, the measure would still be useful from a military standpoint if it operated to hasten the defeat of the Allied armies, so as to prevent the intervention of new belligerents on the battlefields of Europe. It was thus a question of time; and on the strength of the present situation it is possible to affirm that the German calculations failed.

The Entente has suffered severely from the submarine; but the offensive preparations on the western and Italian fronts have

nevertheless developed with increasing vigor, and as for the Russian front, it is impossible to attribute anarchy to submarines.

"It was planned last year," Lloyd George recently stated, "to carry out a grand concerted attack. Russia was ready as never before; the jaws began to close, but, to speak frankly, one of the parties found itself for the moment handicapped, and as a result it was impossible to secure the convergent pressure hoped for. Whatever our difficulties, we find ourselves strong and steadfast at the end of three years of war. We may say with all assurance that we would not exchange our military situation to-day for the enemy's. Let us look at the facts. What could Germany accomplish in a year in which one of her enemies, deemed the most dangerous at the outbreak of war, was virtually paralyzed by internal difficulties? We should at least expect her to defeat all assaults on other fronts. On the contrary, she has been beaten in every important battle—and these indications are not misleading."

As regards the effect of the submarine campaign on land warfare, there are evidently but two possible hypotheses. One is that the submarine has exerted no appreciable influence on the military situation. In other words, that if there had been no such campaign, the situation on the land fronts would still be practically what it is to-day. The other hypothesis is that, but for the submarine, Germany would now be conquered.

In view of the assured participation of American forces on the western front, it follows that, if on the basis of the first hypothesis the submarine has not improved the military situation, then the count is heavily against it, since it has been the cause of a powerful reinforcement to the Allies. On the basis of the second hypothesis the submarine campaign appears at best a cruel remedy, which has served to prolong the conflict, postponing an outcome the character of which was indicated when the Germans were halted on the western front.

The intensive "attrition" warfare carried on against Allied commerce has been accompanied by a similar campaign against the Allied navies, a campaign which in the North Sea has been prosecuted by every means at the enemy's disposal, including fleet actions, whereas in the Adriatic the Austrians have consistently avoided risking their main units.

Notwithstanding the losses incurred, the situation after three years of war still proves the overwhelming superiority of the Allied fleets, without regard to naval reinforcements from the United States.

Submarines, mines and aircraft have excluded the possibility (a moot point before the war) of a blockade maintained normally by a strong cruising force in enemy waters; instead, as was foreseen, the blockade is maintained *by a fleet in force at its bases*.

The Allied fleets are nevertheless blockading fleets in the true and proper sense of the word, since they are the means of completely cutting off the sea communications of the enemy, and preventing their fleets from undertaking a serious offensive or issuing from their bases without incurring battle against superior force.

This holds without disregard for the fact that, as a result of geographical conditions, the narrow seas where the Allies enforce the blockade are at a considerable distance from the enemy bases.

The situation of a blockading fleet, however superior, is obviously difficult, since it must be held in constant readiness to check an initiative undertaken by the enemy at his own selected time; hence arises the possibility that the enemy may occasionally gain a success in secondary actions, carrying out his policy of attrition. This advantage is increased in the present instance by the peculiar character of the enemy coasts, already noted, which prevents the blockading fleet from forcing an engagement.

In this situation, until the enemy fleet decides that the opportune moment has arrived to issue forth and take the chance of battle and possible destruction, the mission of the blockading fleet consists in maintaining the equilibrium. And whatever the inherent advantages in the supremacy thus secured over all the seas (except the Baltic and Black), this mission is still a thankless one, for it seems synonymous with an inertia and uselessness not ordinarily regarded as in keeping with the character of naval warfare.

In the land war, every battle has tangible results in the way of territory gained, maintained, or lost; in the naval war, on the other hand, if one fleet merely paralyzes another, forcing it to remain shut up in port for safety, or if in a battle in which losses are balanced, it gains a strategic victory (forcing the enemy to

resume a passive attitude), or even if, finally, it succeeds in inflicting a full defeat, it still seems to have made but snail's progress toward a victorious peace. Scattered over the surface of the ocean, the wreckage of battle seems to question why all these men have died; and a tragic day's work is seemingly in vain.

But let those who are thus misled simply ask themselves what would have happened had our preponderance of strength been swept away and the enemy secured freedom of action on the seas.

Those who are very rightly preoccupied to-day with the menace of the submarine, may well reflect upon what would happen if naval preponderance should pass into the hands of the enemy. In that case, we should at least have a quick proof of what the Germans might have done at the opening of the war—our sea trade would cease to exist. And how would our armies fare then? Have we sufficient iron, coal, munitions of war?

It may therefore be taken as mathematically certain that the fleet, while, owing to the enemy, its work is *silent* and *obscure*, constitutes a vital factor on a par with our armies. Nor will it be denied in the future, considering the difficulties (perfectly manageable and tolerable) that we now endure, that *this war has shown in how great a measure we depend on the sea*.

This granted, especially by those who nourish certain illusions of easy accommodation with the enemy and a return to the *status quo ante*, let us look into the fundamental principles that have led our adversaries to bring on the tremendous conflict, principles that are reflected clearly in their views on naval warfare.

Bernhardi, in the work previously cited, already foreseeing Italy's participation with the Allies, wrote as follows:

"We shall, therefore, some day, perhaps, be faced with the possibility of standing isolated in a great war of the nations . . . and shall have to trust solely to our own strength and our own determination to conquer. This steadfast determination to win complete victory will make the next war *one of unprecedented violence*. A war fought and lost under such conditions would destroy our laboriously gained political importance, would jeopardize the future of our nation, would throw us backward for centuries, would shake the influence of German thought in the civilized world and thus check the general progress of mankind in its healthy development, for which a flourishing Germany is

the essential condition. Our next war will thus be fought for the highest interests of our country and of mankind. This will be its importance in history. *World power or downfall* will be our rallying cry. We must have the steadfast will to conquer, the iron resolution *to struggle to the end, even in the event of a lost war.*"

The facts demonstrate that the conduct of our enemy in the war has been in complete accord with these principles.

Admiral von Tirpitz, in an interview in December, 1914, in which he first threatened the employment of the submarine against commerce, complained at the feebleness of American protests against England's closure of the North Sea, and put the question: "What objection could the United States make if Germany should declare submarine warfare against the entire enemy merchant marine?" When Tirpitz spoke thus, the threat was already in process of execution, for the sinking of merchantmen by submarines had begun during the preceding October; and on February 4 (1915) following, Admiral von Pohl, head of the German Admiralty, proclaimed as a "danger zone" all the waters around the British Isles, including the Channel, upon entering which both enemy and neutral vessels would be subject to destruction without assurance for the safety of passengers or crew.

The events that followed are familiar to all. The United States despatched note upon note, but for a long time it looked as if her protests would be confined to the diplomatic field. Meanwhile, the land war failed to give Germany the results hoped for, the decisive action attempted at Verdun failed, and so the submarine campaign was pushed to the uttermost limit, without regard to the nationality of vessels attacked, the enemy thus elevating a secondary into a principal weapon, and attributing to it an importance not less than that of her armies in the field.

Thus Germany no longer considered what the United States would do; *she burned her bridges behind her*, giving to her naval, as to her land warfare a character of unprecedented violence, seeking to strike terror by showing herself ready to make war on all the world, employing every means to secure world power, wishing no compromise between that and downfall.

In striking contrast, indeed, are the indefinite peace proposals Germany has repeatedly given forth. To dispel the delusion that

people with purposes so fixed will easily renounce their aims, it is sufficient to record the words of Bernhardt: "Aspirations for peace contain an element of weakness, dissention, and indecision; their apparent humanitarian idealism constitutes their danger; they are in reality *an unhealthy utopia, or a cloak to cover intrigue.*"

Only upon a profound realization of the set purpose of our adversaries, and recognition of the fact that every show to the contrary is a device to break down our morale, are we in a position to ask what use the enemy intends to make of his main fleet.

In the North Sea, neither the prevalent foggy weather nor the multitude of units in the opposing force excludes the possibility that the Germans can secure opportunities to impose action in superior force.

Such was axiomatically the strategic principle guiding the general sortie of the German fleet before Jutland, aside from particular circumstances, as yet unknown, which may have led the Germans to leave their bases.

In the battle following, both belligerents suffered severely; but while it is needless to enter into a discussion of the tactical results, it will be agreed that the battle demonstrated the full capacity of the British fleet to execute its mission as a blockading force. After the battle the strategic situation remained unchanged—that is, the maritime supremacy of Britain was confirmed.

But it will be useful to note the proof thus afforded of the resolute purpose of Germany to pit her main fleet against her chief opponent. And in view of the fact that the guiding principle of German war policy throughout has been to utilize *all* forces to the extreme limit (even in case of a lost war), it seems by no means hazardous to affirm that the day will come in the course of the war when Germany will be led to undertake a desperate effort on the sea. Before resigning herself to decadence, she will play *all* her cards; she holds back, however, for while she is a player of extraordinary boldness, she knows that the cards corresponding to the navy are precisely the ones that must be played at the right time.

Reflection upon the importance of the naval side of the war and upon the full guaranties of success afforded by the naval predominance of the Allies, is essential to a clear vision of the certainty of our victory.

III. CHANGES IN NAVAL WARFARE

Only after bringing out by the preceding discussion the vital function of the main fleets, are we in a position to give a logical answer to the question put as the main theme of the present essay—as distinguished from delusions based on appearances, what are the substantial differences between the war as it is and the war as it was foreseen? Granted that, along with new weapons (submarine and aerial) the war has confirmed the present usefulness of old types, what changes for the immediate future are counseled by experience? May certain categories be at once eliminated?

As a result of the previous development of submarines and aircraft, it was realized before the war that great precautions would be necessary in carrying out a military blockade, and it was admitted not only that it would be folly to attempt a close blockade with the main fleet, as in the Spanish-American war, but that it would be impossible to keep the fleet within a cruising radius of about a hundred miles from the enemy bases, that is to say, within the distance considered safe when the defence was limited to torpedo craft. This development by no means eliminated the idea of blockade, but implied that the blockading force must possess well-located bases, though distant from the enemy, assuring a close patrol of enemy waters, and a sufficient number of units of varying sizes to maintain contact with a force trying to break through.

It was known that the British Navy, in harmony with this concept, and confronted by the threatening growth of the German fleet, had opportunely established bases in the north of Scotland and the near-by islands; and in consequence it was easy to presume that, to avoid division of strength, the approaches to the Straits of Dover would be closed chiefly by mines.

From the time of the Russo-Japanese War, the extensive use of mines was foreseen, especially in the North Sea, where strategic and hydrographic conditions are favorable.

Under these circumstances, there was nothing unexpected in the British Admiralty notification of October 3, 1914, announcing that, in view of German mine-laying and submarine activities, the government had authorized the mining of certain parts of the North Sea, and in particular an area of 4000 sq. km. between Ostend and the English coast.

It was very naturally foreseen that the countries whose communications were thus intercepted would exert every effort to keep up their trade by means of neutrals, and it was known in fact that Germany had in time of peace perfected an organization to that end. Yet in the beginning of the war England suffered this ostensibly neutral traffic beyond all tolerable limits, as shown by the rapid and enormous increase of imports to Scandinavia and Holland.

By those who took account of the necessities of modern warfare, it was recognized that, however inferior the enemy navy, it would be impossible to conform strictly to past standards as regards continuity and effectiveness of blockade in territorial waters, that the blockade would cover stretches of coast rather than specified ports, and that contraband would be given a wider application.

November 2, 1914, that is, a month after the mine-field notice, England proclaimed all of the North Sea a *military area*, the effect being that ships of all nationalities would incur danger in crossing a line from the Hebrides through the Faroe Islands to Iceland. Thus England seriously restricted neutral commerce, which, however, could still be carried on by following prescribed routes.

We enter the realm of the unforeseen when we pass from the action of England to that of Germany, as a result of the employment of the submarine as a commerce destroyer operating for long periods and remote from its bases.

This new system of commerce destruction, as now applied by Germany, signifies complete disregard of the consequent attitude of neutrals—that is to say, quite aside from humanitarian considerations involved, such a course of action could be conceived *only* by a belligerent who would permit no interests whatever to interfere with a possible means of injuring the enemy. Such is the course Germany has seen fit to pursue; but in a general forecast of future international provisions in this matter, it would be absurd to assume submarine warfare in its present unrestricted form as the normal recourse of the weaker belligerent on the sea. The attitude of neutrals cannot be regarded as negligible; and it follows that submarine warfare will be *tolerated only to the point where neutral states feel constrained to resist*.

With the idea of determining the extent to which the submarine as a commerce destroyer has altered naval warfare, let us assume the utmost passivity on the part of neutrals.

Let us consider in succession the two methods of employment: unlimited "*cruiser warfare*," and *blockade of limited areas*.

It would be illogical to deny to the submarine, as to other naval vessels, the right of visit and search, the resultant situation being inevitably as follows:

Normally, the only measure the submarine can employ against enemy merchant vessels is to sink them; hence, necessarily, the merchant vessel has the right to arm for defence, to combat the enemy by any means, and to practice every stratagem to avoid destruction.

Evidently, under these conditions, the exercise of visit and search is out of the question. This was verified, in fact, by the astute German Admiralty in its notice to the United States at the opening of the unrestricted campaign: "Great Britain has armed her merchant vessels for defence against submarines, and the United States has accepted the British point of view. But under these conditions it is impossible for a submarine to approach a merchant vessel to examine her papers, since in so doing, in case the vessel is of enemy nationality, the submarine is exposed to attack by gunfire and bombs. Moreover, the enemy has advised her merchant vessels to fly neutral colors, paint out names, alter funnels, and seek by other ruses to avoid the consequences of nationality."

Neutrals being thus deprived of the guaranties inherent in visit and search, and neutral naval convoy for merchantmen being impracticable, it follows necessarily that *unlimited "cruiser warfare" cannot be carried on in a manner acceptable to neutral states*.

It will therefore be seen that submarine operations against commerce must be confined to blockade in the ordinary and proper sense of the word. And moreover, in view of the requirements of continuity and effectiveness (which cannot be fulfilled in case of submarine blockade), it is clear that, unless neutral rights are to be enormously sacrificed, the blockaded area must be not only clearly defined, but reasonably restricted. Otherwise we should fall back again into unrestricted cruiser warfare, as now actually practiced; for in immense areas such as those set off by Germany, including at first the waters around the British Isles and later large parts of the Atlantic and Mediterranean, a blockade can exist only in name.

Let us suppose that neutrals, on the basis of their assumed passivity, should make no objection to a blockade extending beyond territorial waters and applying not merely to a specified extent of coast but to the entire enemy coast-line. Let us assume the blockade zone to extend outward from the coast 20 or 30 miles; and within this zone, let us assume submarine and submarine mine-layer activities in every form.

Obviously neutrals would not consent that such a blockade should cut off straits which are necessary highways for trade between neutrals. But limiting the activities of the submarine in this manner, what may be said as to its effectiveness?

On the basis of present experience, it will be readily granted that, within these limits, in sectors having important ports as their centers, it would be possible to maintain safety routes by airplane and patrol activity of various kinds so intensified as to *make successful enemy attacks absolutely exceptional*. In fact, on the basis of this hypothesis, which assures safety to ships outside the zone, a far greater number of units would be available for the task of clearing safety routes within the zone itself.

Hence it seems logical to conclude that *submarine commerce warfare loses its capacity to exert a serious effect on warfare whenever it is carried on in a manner tolerable to neutrals*. In other words, it is simply a question whether the unrestricted warfare now carried on by Germany does or does not come under that classification.

To avoid falling into the absurdity of considering complete disregard of the attitude of neutrals as the general norm for the future, we are forced to recognize that *the method of attack on commerce which to-day constitutes the chief change in naval warfare cannot be considered as having a substantially permanent character*.

We are led to this conclusion absolutely without taking into account the anti-submarine measures that may eventually be developed. And now if we should assume submarine commerce warfare abolished, or at least reduced to an element of secondary importance, wherein lies the astounding divergence between forecasts and reality in the naval war?

In respect to changes in doctrine as to the employment of sea power, that is to say, the proper objectives of battle fleets, we encounter simply an evolution rather than a revolution of ideas,

whether in the field of strategy or tactics. The increased dangers arising from the development of more recent means of warfare have tended to limit operations to such as have a very definite character, and are of sufficient importance and sufficient prospect of success to warrant the risks taken and the extent of the force employed. This means simply that modern conditions have imposed a stricter regard than in the past for sound principles of warfare. It is of chief interest to note that large fleets of belligerents have put to sea when it was deemed necessary, have come in contact, and have engaged in heavy combat in a manner foreseen before the present development of submarines.

One of the most important teachings of the present war is the practical demonstration of the disputed principle that, for ships of the line as for other types, high speed is a factor of the greatest importance, whether from a strategical or a tactical standpoint; in this respect, *reality has abundantly confirmed the most favorable predictions.*

There was nothing unexpected in the manner in which at Jutland contact between the two forces was first established by light and battle cruisers, nor in the manner in which this led up to the engagement between the main fleets. Moreover, the decisive importance of long-range combat, as brought out by the war, has completely confirmed those principles that for the last 20 years have guided the evolution of tactics, types of ships, and methods of fire, on the basis of the axiomatic necessity of *hitting at the earliest moment (i. e., at long range) and hard.* War experience has likewise confirmed the foreseen importance of day attacks by destroyers during contact between main forces, as well as similar attacks on the night after battle. These, among other confirmations of theory, are cited not with the idea of extended examination, but merely to emphasize the absurdity of declaring the downfall of naval principles as set forth before the war.

While particular considerations of a more technical character would be inopportune at the present time, the observation may be made that of the two chief types of armored ship—the battle cruiser and the dreadnought—it is the former whose future place must be considered more secure. Experience has demonstrated that this type of ship, aside from its essential function when incorporated with the fleet, is well adapted to supply most expeditiously and completely the protection required for remote maritime in-

terests, as illustrated by what happened at the Falklands. Its value has been brought out also under conditions prevailing in more restricted waters, whether for compelling the enemy to fight under adverse circumstances, or for getting within range before the enemy can withdraw to his base.

In long-range actions, owing to the sharper angle of fall of projectiles, ships are relatively more vulnerable on account of insufficient horizontal protection; hence some change is called for in the disposition of armor.

The increased risks encountered by ships render it desirable to apply so far as possible the principle (old rather than new) of dividing the strength of the line into numerous units, without lowering the total strength. This principle, however, should be applied with due regard to effective fire control, which does not permit reducing the number of heavy guns per ship beyond a certain limit, and with regard also to the extension of the line involved in the multiplication of units when in column at high speed.

Reasoning thus in summary fashion, the statement may be ventured that the ideal type of armored ship, under conditions to-day, should have about 30 knots' speed, 8 guns of large caliber, and armor protection considerably modified from present practice.

This by no means implies the abandonment of present types—simply their evolution, consisting in the fusion of the line battleship and the battle cruiser. (Note: This does not exclude the possible advantage of a new type of battle cruiser, supplementing the type just suggested, with greater speed and fewer big guns.) Further than this, it cannot be said absolutely that the experience of the war counsels the elimination of any category of ships now constituting the fleet.

We come back thus to the fanciful hypothesis that the abolishment of first-line battleships, in spite of technical counsels, will be accomplished by future international agreement. This, as already said, is based on the supposed equilibrium now existing between the opposing fleets. But, as we have shown, this equilibrium is far from existing in reality; for even if the present war had not presented and should not present a combat between the main forces, the fact would nevertheless remain that naval superiority has conferred upon one of the belligerents a freedom

of maritime communications which, however contested by submarines, remains an essential decisive factor in the war.

One should also bear in mind that any war, whatever its magnitude, represents a particular case; and in drawing lessons, one should not only seek a right interpretation of what actually happened, but should also consider how it may happen differently in future. Thus, even assuming (though by no means admitting) an equilibrium in this war, that certainly is not the only possible outcome of the co-existence of two opposing fleets. As a matter of fact, for a country not invulnerable to a naval offensive to the same extent as the Central Powers, and inferior to its enemy in naval strength, the assumed equilibrium would be absolutely non-existent.

In consideration of the disparity arising from unequal naval development and different possibilities of maritime defence among nations, and recognizing that against an enemy fleet defence by minor means (mines, aircraft, submarines, torpedo craft and scouts) is insufficient, we may conclude that the idea of abolishing battleships should be relegated to the realm of a perilous utopia.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE REQUIREMENTS FOR ADMISSION TO THE
NAVAL ACADEMY—AN HISTORICAL REVIEW

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It is the purpose of this article to review the various changes that have taken place in the examining and selecting of candidates for the Naval Academy, and to present certain facts of interest to all friends of the navy. Aside from contributing slightly to the history of naval education, the writer hopes to assist in proving the reasonableness of the Academy's standards and the feasibility of raising the average of those who are later to become the officers and commanders of our fighting ships. The first part of the article will take up the aim and methods of the early examiners of candidates, the examination subjects in comparison with contemporary college requirements, and the various changes that have occurred, with their bearing on present conditions. The second part will show the uniform tendency of the changes in methods of selecting candidates and the possibility of improving, through better selection, the material out of which naval officers are to be made.

In 1845 the seven successful candidates were "found respectable in intellect and attainment," after being examined in accordance with Commander Buchanan's "Plan of the Naval School at Fort Severn," of August, 1845. In this he had proposed the following requirements for the admission of candidates:

Every applicant for admission to the school must be of good moral character, not less than thirteen nor more than sixteen years of age,¹ and

¹ The age of admission for candidates has varied from thirteen to twenty-two years. From October, 1845, to October, 1851, the minimum was thirteen and the maximum sixteen. From 1852 to 1855, it was fourteen to sixteen; from 1855 to 1861, fourteen to seventeen; from 1861 to 1863, fourteen to eighteen; from 1863 to 1865, fourteen to seventeen, except that enlisted boys were allowed to enter up to the age of eighteen years.

must be examined by the surgeon of the institution to ascertain if he be free from all deformity, deafness, nearness or other defect of sight, or disease or infirmity of any kind which would disqualify him from performing the active and arduous duties of a sea life. He must be able to read and write well, and be familiar with geography and arithmetic. The Academic Board will examine him on these branches, and certify to his capacity for admission into the school.

The last sentence indicates what the first superintendent of the Naval School thought should be the basic principle in examining candidates. Some years later the Academic Board² formulated its ideas on this important question as follows:

From 1865 to 1880 the ages of admission were fourteen to eighteen, but from July, 1864, to August, 1882, "cadet engineers" were permitted to enter between the ages eighteen and twenty-two. Some of the "acting third assistant engineers," however, were even admitted as old as twenty-three years and nine months. After the fifth of August, 1882, fourteen to eighteen years were the ages required for all candidates. Age, as well as other entrance requirements, then became the same for all candidates, and no difference was made between "cadet midshipmen" and "cadet engineers"; all after admission were thereafter styled "naval cadets." On March 2, 1889, the minimum age of admission was established by law as fifteen years, and the maximum as twenty. These were the limits until January, 1904, when the minimum became sixteen. The present requirements, it is needless to add, are sixteen to twenty, at the date and on the day of admission. The phrase in the regulations, "examination for admission," is not taken to mean the mental examination, but the physical examination which immediately precedes the candidate's taking the oath of office and being admitted into the Academy.

² A quaint and illuminating example of the Board's difficulties was the case of Gaza Harasrthy. On the eleventh of October, 1848, "The Academic Board met for the purpose of examining Gaza Harasrthy of Wisconsin (Hungarian by birth), a candidate for admission into the Naval School. The case of this young man was peculiar. He has brought a letter from the Hon. Sec^y. of the Navy expressing a strong wish for his admittance & intimating that his knowledge of the German and Hungarian languages might make amends for his ignorance in the requisite branches. He was accompanied also by his friend, the Hon. Joel B. Sutherland, who showed great anxiety in the case. The Superintendent of the Naval School had, the preceding evening (10th), sent for Prof. H. H. Lockwood, (Mr. Chauvenet being absent from Annapolis) and had expressed a wish or command, to have a special & detailed report respecting this examination.

"The examiners were Prof^s. H. H. Lockwood, Girault, and Jones. The candidate was found to be deficient in all the branches specified in our orders for such occasions. The Board decided not to consider the orders from the Supt. Nav. School as official, in as much as they were not made in an official form. They therefore directed their chairman

The object of this examination (for admission) is twofold, *primarily* to ascertain the *capacity*, and secondarily the *attainments* of the candidate. If he gives very clear evidence of good capacity and intelligence, it becomes unnecessary to insist upon an exact conformity to the *letter* of the regulations of the Department, requiring him to be *familiar* with Arithmetic and Geography.³

With a view to testing the capacity of candidates—their intellectual power rather than their attainments—they were required from 1845 to 1884 to “pass a satisfactory examination before the Academic Board.” The examination was almost entirely oral, with little more than enough written work, such as writing from dictation, to test the candidates’ penmanship. The personal impression counted heavily. In very much the same way, candidates for the Royal Naval College at Osborne, England, at the present time are examined before the Interview Committee appointed by the First Lord of the Admiralty. In 1875 the Register announced that “all examinations, except in reading, will be written.” Although oral examinations, or personal interviews, may have ceased in 1875—so far as can be determined from the journal of the Academic Board—it was not until the fall of 1883 that the Regulations were changed. From 1884 to 1902, inclusive, candidates were examined at the Academy “by the Academic Board,” in the phrase of the Registers. The first examination conducted by the Civil Service Commission, as stated by the Secretary of the Academy, was on August 13, 1901. From April 21, 1903, the regular examinations have been conducted by the Civil Service. The last examination held in Annapolis was in June, 1911.

The subjects and other details of the entrance examination were largely decided by the Academic Board until 1862. In that year

pro tem., Prof. H. H. Lockwood, to make out the report simply in the usual form, ‘not qualified’, & to say to the Supt. that if he would give an official order, we would make out a special and detailed report: but that its only effect could be to show more strikingly the great deficiencies of the candidate.

Attest—GEO. JONES Secy.”*

* Printed through the kind permission of the Superintendent, Rear Admiral E. W. Eberle, from the Record of the Proceedings of the Academic Board of the Naval School, October 4, 1845, to June 20, 1854.

³ See Record cited, p. 48.

was enacted the provision,⁴ still in force, that "All candidates for admission into the academy shall be examined according to such

⁴The act of 16 July, 1862, was revolutionary. It provided commissions on graduation from the Academy. These were given on 28 May, 1863, to the 20 midshipmen graduating that year, but were withheld from succeeding classes by a ruling of the Department. Other innovations were the title of midshipman, appointments by the President at large and from enlisted men, appointments in certain circumstances by the Secretary, and the nomination of alternates. Section II of the act follows. "That the students at the Naval Academy shall be styled midshipmen *and* until their final graduating examination, when, if successful, they shall be commissioned ensigns, ranking according to merit. The number allowed at the Academy shall be two for every member and delegate of the House of Representatives, two for the District of Columbia, and ten at large. They shall be between the ages of fourteen and seventeen, physically sound and well formed, and of robust constitution. They shall be examined for admittance into the Academy according to the regulations which shall be issued by the Secretary of the Navy, and if rejected shall not have the privilege of another examination for admission to the same class, unless recommended by the board of examiners. The President shall select the two from the District of Columbia and the ten at large, and the President shall also be allowed three yearly appointments of midshipmen, who shall be not over eighteen years of age, who shall be selected from boys enlisted in the navy, and who have been at least one year in the service, six months of which shall have been sea service. From and after the fifth of March, eighteen hundred and sixty-three, the nomination of candidates for admission into the Naval Academy shall be made between the fifth of March and the first of July of each year upon the recommendation of the member or delegate, from actual residents of his district, and they shall be examined for admission in July: *Provided*, That when any candidate who has been so nominated shall upon examination be found physically or mentally disqualified for admission the member or delegate from whose district he was so nominated shall be notified to recommend another candidate who shall be examined in September following. And it shall be the duty of the Secretary of the Navy, as soon after the fifth of March as possible, to notify, in writing, each member and delegate of any vacancy that may exist in his district; and if said member or delegate neglects to recommend a candidate by the first of July in that year, then it shall be the duty of the Secretary of the Navy to fill the vacancy. Midshipmen deficient at any examination shall not be continued at the academy, or in the service, unless upon recommendation of the academic board; nor shall any officer of the navy who has been dismissed by sentence of a court-martial, or suffered to resign to escape one, ever again become an officer of the navy: *Provided, however*, That no greater number of midshipmen shall be appointed by the President at large under this or any other law of Congress than shall be allowed by the provisions of this section."

regulations and at such stated times as the Secretary of the Navy may prescribe."

The first subjects that candidates were examined in were reading, writing, geography, and arithmetic, as outlined in the plan of the first superintendent.⁵ The standard required was indicated in the Register of 1860, as follows: Candidates for admission "must be of good moral character, able to read and write well,—writing from dictation and spelling with correctness,—and to perform with accuracy the various operations of the primary rules of Arithmetic; viz., numeration, and the addition, subtraction, multiplication, and division of whole numbers." English grammar was added in 1862, according to the following notice: Candidates "will be examined as to the parts of speech and the elementary construction of sentences, and will be required to write an original paragraph of a few sentences."

The early requirements of the Naval Academy were apparently designed to equal, as far as was practicable, the requirements of colleges during the forties and fifties. An examination of the entrance requirements of Harvard and Yale, for instance, makes it clear why such seemingly elementary subjects as arithmetic and geography were included in the Academy's requirements. In 1845 Harvard's requirements were as follows:

For admission to the Freshman Class the candidates are examined in the following books, viz.:—

By the Latin Department in the whole of Virgil and of Cæsar, in Cicero's Select Orations, Andrews' and Stoddard's Latin Grammar, including Prosody, and in writing Latin.

By the Greek Department in Felton's Greek Grammar, Sophocles's Greek Grammar, including Prosody, and in writing Greek (with the accents).

By the Mathematical Department in Davies's and Hill's Arithmetic; Euler's Algebra, or Davies's First Lessons in Algebra to "The Extraction of the Square Root"; and "An Introduction to Geometry and the Science of Form, prepared from the most approved Prussian Text-Books," to "VII of Proportions." Also in Worcester's Ancient and Modern Geography.

The college entrance requirements of this period are indicated in the following terms of admission to Yale College for the year 1845:

Candidates for admission to the Freshman Class, are examined in Cicero's Select Orations, the whole of Virgil, Sallust, Jacobs', Colton's or

⁵ J. R. Soley—History of the Naval Academy (1876), p. 57.

Felton's Greek Reader, the first three books of Xenophon's *Anabasis*, Andrews' and Stoddard's Latin Grammar, Goodrich's or Sophocles' Greek Grammar, Andrews' Latin Exercises, Latin Prosody, Arithmetic, English Grammar, and Geography.

The deficiency of most candidates for admission, in the Latin and Greek Grammars, Latin Prosody and Composition, Geography, and the theoretical part of Arithmetic, makes it necessary to remark, that the examination in these subjects will be strict and comprehensive. Candidates will also observe, that Arithmetic is no longer studied in College, and an examination for admission is therefore held in both the theory and practice of Arithmetic.

No one can be admitted to the Freshman Class, till he has completed his fourteenth year, nor to an advanced standing^a without a proportional increase of age.

A very interesting innovation was made at the Naval Academy in 1866, when competitive entrance examinations were first held for "cadet engineers," or, as they were first called, "acting third assistant engineers." The following were the subjects: Arithmetic, algebra, geometry, rudimentary natural philosophy, elements of inorganic chemistry, English grammar and English composition, United States history, pencil sketching and right-line drawing, and the operation and uses of engines and tools. In 1870 free-hand drawing was substituted for pencil sketching. Chemistry, history, and drawing were omitted in 1871; geography was not required of cadet engineers until 1874.

In 1882 the distinctions between cadet midshipmen and cadet engineers were abolished, so that all aspirants had to meet the same

^a Before 1871 the Regulations for the admission of candidates contained a provision of considerable interest; namely, that "A midshipman may be advanced to any class which he may be found qualified to join, either upon his admission or at any subsequent examination; and he may be graduated at any June examination at which he shall be found fully qualified to pass a graduating academic examination." Under this provision, two cadet engineers entered the Academy in 1867, and graduated in 1868 with the class of acting third assistant engineers that had entered in 1866. The late Admiral Mahan entered the Academy as a third classman on 29 September, 1856, graduating in June, 1859, second in his class. At the semi-annual examination, also, in February, 1852, ten members of the class that entered in 1851 were selected for advancement. Six of them, including Thomas O. Selfridge and Joseph N. Miller, graduated in 1854. Oddly enough, the first midshipmen to finish the continuous four-year Academic course, which had been instituted in October, 1851, really finished in three years. No provision for advanced standing was announced after 1870.

requirements. These comprised United States history and algebra, after 1882, as well as the original subjects, writing, reading, spelling, arithmetic, and geography. In 1889 world's history and plane geometry were added, and in 1902 punctuation. In 1905 reading, and in 1913 world's history, were omitted. During 1913-1914, it might be added, "general history" was taught at the Naval Academy. It was dropped from the curriculum after a poll of the third and fourth classes had revealed the fact that general or world's history was almost universally taught in the secondary schools of the country.

In all of these changes in entrance requirements, the Naval Academy has been held back by the standards of the public schools of the nation. It has followed, though tardily, the practice of the colleges. Algebra, for instance, was first required of all Academy candidates in 1883; but the colleges had required it for 20 or 30 years. Yale, for example, required algebra to quadratics of all candidates as early as 1846. We should note the fact, likewise, that for many years our colleges have not required arithmetic or geography for entrance, but have for many years required fairly wide reading in literature, a good knowledge of general history, a knowledge of civics and the Constitution, and a fair command of at least one foreign language besides Latin. Our secondary schools, moreover, with few exceptions, offer courses in conformity with these requirements.

The subjects now required by the Naval Academy, according to the regulations of the Secretary of the Navy, are spelling, grammar, geography, United States history, arithmetic, algebra, and geometry. For none of these does the candidate need special coaching, unless his secondary training has been weak in the fundamentals of English and mathematics. Certain changes, however, are now being formulated by a special board appointed by the superintendent with a view to bringing the Academy's entrance requirements more into the educational currents of the country.

So much for the examining of candidates. The ideal, from the first, has been to test the candidate's intelligence or "capacity" rather than his acquisition of facts, his ability to "make good" in the Academy rather than his "cramming." Requirements have been increased as fast as the standards of the secondary schools have been raised so as to include subjects, like reading

and writing, that must be mastered by every naval officer, and still ought not to burden the Academy's curriculum. In a period when colleges were receiving boys of fifteen who knew a little Greek, Latin, arithmetic, grammar, and geography, the Naval Academy accepted boys of thirteen who knew the three R's, reading, 'riting, and 'rithmetic; who were "able to read and write well, and to perform with accuracy the addition, subtraction, multiplication, and division of whole numbers." Both colleges and Academy have increased their requirements; but the Academy has not been allowed to keep pace with the colleges.

Many criticisms⁷ of the Academy and its entrance requirements have not been well founded. There are some facts in connection with the entrance examinations that ought to be understood before judgment is passed. The practice has become rather frequent in recent years of allowing all applicants from some districts, without any preliminary test, to take the Academy's entrance examinations in competition with each other for the appointment. Some-

⁷ Most of the reports are inaccurate, that the entrance examinations are too difficult and that only a small fraction succeed in passing. The results of candidates' examinations for the last five years have been as follows:

	Examined	Rejected	Accepted	Percentage Accepted
1913, February	135	64	71	52.59
April	591	381	210	35.53
June	303	228	75	24.75
1914, February	127	59	68	53.54
April	543	286	257	47.15
Enlisted	115	110	5	4.34
1915, February	200	105	95	47.5
April	520	320	200	38.46
Enlisted	55	44	11	20
1916, February	227	128	99	43.61
April	1216	763	453	37.25
Enlisted	66	43	23	34.84
July	350	255	95	27.14
1917, February	274	111	101	36.86
April	727	331	293	40.64
Enlisted	18	14	4	22.22
June	1417	1039	376	26.55
Total in five years.....	7134	4311	2823	39.57*

* For help in obtaining this and other information the writer gratefully acknowledges his indebtedness to Mr. P. H. Magruder, Secretary of the Naval Academy.

times only one out of a dozen succeeds in passing, with a perceptible lowering of the general percentage of successful candidates. In June, 1917, for instance, out of 120 candidates nominated thus for examination, only 17.5 per cent passed. Out of the total of 1417 candidates in that examination, 26.55 per cent passed.⁸

Another pertinent fact is that many candidates, as noted many times by the Academic Board, are utterly unprepared, and should in some way be saved the time sacrificed⁹ in their attempting the entrance examinations of the Academy. In April, 1917, for example, 12.8 per cent of the candidates presenting themselves for mental examination failed in all six subjects.

Obviously, therefore, while changes may be made in the examinations, improvements are also highly desirable in methods of selecting the candidates themselves.

Taking up now the selecting of candidates, we find that great changes have taken place. But nearly every change has been intended by the law makers of the country to widen for the common American boy the door to the commissioned grades in the navy.

From March of 1794 to August of 1842, candidates were appointed midshipmen¹⁰ by the President straight from civil life, with no legislative restrictions as to age, education, or fitness. There was not even a limit, after 1809, upon the number the President might appoint.¹¹ Abuses inevitably developed. After the custom of the British Navy, midshipmen were appointed on the

⁸ Ascertained by a personal examination of the candidates' records.

⁹ The Academy and Navy Department publish complete and extensive pamphlets on the entrance requirements, most of which are entirely ignored by candidates.

¹⁰ The first seven candidates to enter the Naval School were styled, after admission, "acting midshipmen," and that appellation was kept until July, 1862. From then until July, 1870, the students admitted to the Academy were called "midshipmen." After this date and up to August, 1882, they were styled "cadet midshipmen." There were also authorized at the Academy, from 1864 until 1882, special students of engineering. The first of these entered in 1866, two as "cadet engineers," the rest as "acting third assistant engineers." The latter designation was dropped in 1868. After 1882 "naval cadet" was employed for all candidates admitted into the Academy, and was retained until July, 1902, when the good old grade of "midshipman" was restored.

¹¹ Park Benjamin—United States Naval Academy (1900), p. 29.

recommendation of captains in the navy and of political friends of the executive. Appointments came to run in grooves. Naval service, naval rank and influence, became almost a heritage of certain families and certain sections. Some political appointees, like Philip Spencer, proved to be outrageously unfit. Some districts secured an undue share of appointments. The charge was made, and not refuted, that of the 158 midshipmen appointed in 1841 no less than 70 had come from Washington, Maryland, and Virginia. As was to be expected, therefore, limitations were soon placed on the power of the executive to appoint candidates as midshipmen. In 1842 the number of midshipmen allowed by law was limited to 262. In 1845 the number of midshipmen allowed from each state and territory was made proportionate to its number of representatives, and it was decreed that the appointee should be an actual resident of the state from which he was appointed. In 1848, when the authorized number of midshipmen was increased to 464, it was required that appointments should be equally apportioned among the several congressional districts. In 1850 the law provided that no midshipman should be appointed from any district that had more than two midshipmen already in the navy.

Soley's history of the Naval Academy explains the origin of the present method of selecting candidates in the following way: "As it was impossible for the Secretary of the Navy to know much about the inhabitants of each congressional district, he naturally came to rely somewhat upon the testimony of the member representing the district in regard to the fitness of an applicant for appointment. From this it was an easy step to the present system, legalized by the act of August 31, 1852, by which no one can be appointed a midshipman except on the recommendation of the member of Congress representing the district in which the applicant resides. The system had already been adopted in making appointments of cadets at West Point." The power of filling vacancies in the Naval Academy is now shared also by the President, the Secretary of the Navy, senators, the Governor General of the Philippine Islands, and the Governor of Porto Rico.¹²

¹² The problem of obtaining the best candidates is affected by the number to be nominated each year for appointment. The greater the number the greater the care that must be exercised to nominate only the fit and worthy. In 1794, as stated by Park Benjamin, the number of midshipmen allowed by law was 48. In 1801 there were 350. In 1809 the number was

raised to 450, and two months later the President was authorized to appoint to the grade of midshipman as many youths as he deemed necessary. In 1842, the number was limited to 262. In 1848 the limit was made 464, and in 1862 the limit was raised again.

In 1862 two midshipmen were authorized for every member and delegate in the House of Representatives, two for the District of Columbia, ten at large, and three annually from boys enlisted in the Navy of at least one year's service, six months of which must have been sea service. These appointments from the service were authorized until 1870, and are of special interest in the light of existing law providing for the admission of 100 enlisted men annually into the Academy.

Another innovation was made in 1864, when the appointment was authorized of 50 cadet engineers who were to take a special two-year course. Under this law two cadet engineers entered in 1866, but failed to graduate. Two more entered in 1867 and graduated with the class of "acting third assistant engineers," who had entered the Academy in 1866. Cadet engineers re-appeared at the Academy in 1871, when a class of 16 was admitted on the first of October. In 1874 the appointment of cadet engineers was augmented to 25 annually. They were appointed each year after competitive examination at the Academy. 177 candidates competed for these appointments in 1879, 167 in 1880, and 155 in 1881. After bringing into the service some of its keenest minds, these competitive examinations and appointments for cadet engineers were abolished in August, 1882.

Appointments at large came into existence again, after a lapse of ten years, on the fourteenth of July, 1862, when the President was authorized to appoint, for education at the Naval Academy, ten acting midshipmen who were to be chosen from the sons of officers or soldiers. In 1867 the appointments of enlisted boys were increased by law to ten annually, and the other appointments at large also increased to ten annually. In 1870 the appointment of enlisted boys was stopped. In 1878 the appointments at large allowed in the Academy were reduced to ten. In 1902 they were increased to 15, and in 1903 were made five each year, an increase of five in the total allowed. In 1913 the number was increased to ten each year, and in 1916 to 15 each year. Fifteen is the number now authorized by law to be appointed at large by the President.

Returning now to the ordinary appointments, we find in 1867 a reduction in the number allowed by law to one midshipman for each member and delegate in the House of Representatives, and one for the District of Columbia. The number at the Academy was still further reduced in March, 1873, when the term of the Academic course was made six years by law. Appointments were filled thereafter every six years instead of every four years. Quadrennial appointments were restored, however, in June, 1900. Senatorial nominations for appointment were instituted in July, 1902. The second great increase granted the Academy, similar to that during the Civil War, was in March, 1903. Two midshipmen were then authorized for each senator, representative, and delegate, and two for

the District of Columbia. This increase was for a term of ten years, but in 1913 was extended to July, 1919.

In February, 1916, the number of midshipmen allowed at the Academy was increased to three for each senator, representative, and delegate. On April 25, 1917, there was a still further increase to four for each senator, representative, and delegate. This last expansion, however, is to affect only the classes entering in 1917 and 1918.

The appointment of enlisted men to the Naval Academy, which had been authorized in 1862 and stopped in 1870, was resumed in 1914. On June 30, 1914, it was provided that "hereafter, in addition to the appointments of midshipmen to the United States Naval Academy as now prescribed by law, the Secretary of the Navy is allowed 15 appointments annually from the enlisted men of the Navy who are citizens of the United States and not more than 20 years of age on the date of entrance to the Naval Academy, and who shall have served not less than one year as enlisted men on the date of entrance; *Provided*, That such appointments shall be made in the order of merit from candidates who have in competition with each other passed the mental examination now or hereafter required by law for entrance to the Naval Academy, and who passed the physical examination required before entrance under existing law." The number 15 was augmented on August 29, 1916, to 25 annually, and on March 4, 1917, to 100 annually.

Alternate appointments or rather nominations are unique to this country. They are extremely valuable to many boys without political influence who, by means of an "alternate," secure admission to the Academy and the expectation of a commission in the navy. Before July, 1862, no alternates were authorized. After this date, one alternate was allowed to each principal, but only in case the principal failed to pass the earlier of the two candidates' examinations of that year. Alternates and candidates appointed late were examined in September until 1902. From 1902 to 1906, inclusive, five alternates were allowed for each principal, and were permitted to take all examinations with the principals. The present number of alternates allowed is three for each principal; and they may take either the February or the April examination.

In 1903 there was authorized one midshipman from Porto Rico, to be a native of the island and to be appointed by the President on the recommendation of the Governor of Porto Rico. Somewhat similarly, on the fifteenth of February, 1916, the law authorized a citizen of Cuba, Mr. Carlos Hevia y Reyes Gavilan, to be received for instruction in the Naval Academy, at his own expense. Still another special group of midshipmen was created on the August 29, 1916, when four Filipinos, one for each class, were authorized to receive instruction at the Naval Academy. They are to be designated, one for each class, by the Governor-General of the Philippine Islands.

If all the appointments allowed by existing law were filled, there would be at the Academy, during the year 1917-1918, 2094 midshipmen, appointed as follows: 384, four for each senator; 1748, four for each of the 437 representatives and delegates in Congress; 18 already in the Academy.

The only limitation of the power to nominate a candidate for examination and appointment is that he must be an actual resident of the state or district from which he is appointed. The law does not prescribe, however, any judicial or other method for proving residence. The statement of the candidate and the recommendation of the member of Congress are never questioned by the Navy Department. And yet the intent of virtually every single change in the law is clear—to make every district sure of its due representation in the Naval Academy of the United States.

It is evident that the selection of candidates for appointment as midshipmen is very largely in the hands of senators, representatives, and delegates. Here, in the selecting of candidates, is the greatest need of change and the greatest opportunity to improve the raw material for officers, or the stuff that naval commanders are made of. The need of change is shown by the large number of wholly unprepared and unfit candidates that come up for the entrance examinations each year. In June, 1917, for example, there were 1417 candidates examined and 221 of them were wholly unprepared and unfit, for they failed in all six subjects. In April, 1917, 723 candidates were examined and 93 of them failed in every subject. In 1916, out of 1859 candidates, 150 failed in all six subjects. A great many more fail each year in four or five subjects. The nomination of wholly unprepared candidates is the main reason why so many districts are not represented in the Academy, and why sometimes a third of the authorized appointments to the Academy are not filled.¹³

The opportunity for improving this condition has already been made plain by the practice of a considerable number of members of the Congress. In recent years more and more of them have come to impose some sort of competitive preliminary test upon

and 15 entering in 1917, appointed at large by the President; also appointed by the President, one from Porto Rico and two from the District of Columbia; appointed by the Secretary of the Navy from the enlisted force, 21 already in the Academy and 100 to be appointed in 1917. The Secretary is also authorized to permit four Filipinos and one Cuban to receive instruction at the Academy. If existing law is continued in force, there will be at the Academy in four years, that is, during the year 1920-1921, a possible maximum of 2600 midshipmen. According to the usual ratio of filled to authorized appointments, there will probably be in the Academy in 1921 upwards of 2000 midshipmen.

¹³ On 22 September, 1917, there were only 1447 midshipmen in the Academy. There were 2294 authorized.

all applicants for appointment as midshipman, and have in this way selected candidates of demonstrated superiority and fitness for the Academy's work. Such preliminary tests are usually based on previous examination papers of the Academy, and are conducted as a rule by local superintendents of schools. The newspapers of the district are uniformly glad to advertise, without charge, such a competition for the ambitious boys of the district or state. By this means expense for applicants and trouble for the members of Congress are both kept at a minimum.

Competitive examinations have sometimes been criticized as likely to bring appointments to the bookish or even the unprincipled, rather than to those who would make the best naval officers. But the member of Congress can restrict his competitions to those of approved character, and may base his award on other factors besides the examination mark. Rhodes scholarships, for example, are awarded on the basis of moral character, scholarship, athletics, and leadership. And civilian instructors at the Naval Academy are selected on the basis of a competition that includes teaching record, personality and bearing, health, and other factors besides mere ability to write a good examination paper. The aim is to select men according to their capability rather than their attainments alone.

The effect of making nominations of midshipmen on a competitive basis, as already practiced, has been very instructive. In June, 1917, there took the Academy's entrance examinations 206 candidates who had been nominated after taking preliminary competitive tests. Of these, 42.71 per cent were accepted by the Academic Board as mentally qualified for admission to the Academy. Compare with this percentage the 26.55 per cent accepted out of the whole number examined in June. Compare, also, the 17.5 per cent of successful candidates who, without any sort of preliminary test, were nominated for competitive examination by the Academy. In 1916, to take another year, out of 419 candidates nominated after competitive examination, 39 per cent were accepted, while of 1437 candidates nominated without competitive examination only 29 per cent passed. In 1915 the percentages were 42 per cent and 36 per cent, and in 1914, 56 per cent and 46 per cent respectively. No conclusions can be drawn from the few competitiveness of earlier years.

A further advantage of nominating candidates after competitive examination is shown by the records of midshipmen in the Academy. In 1916, out of 128 midshipmen entering after com-

petitive examination only 3.9 per cent failed during the year. Of 475 midshipmen entering otherwise the failures during the year amounted to 16 per cent. In 1915 the percentages of those dropped during the first year after admission were, competitives 12 per cent, non-competitives 19 per cent. In 1914 the percentages were 11 per cent and 13 per cent respectively. Before 1914, the number of candidates nominated after competitive examination was too small to warrant conclusions.

So far, then, as concerns the mental examinations, this review of the requirements for admission to the Naval Academy has shown that the original aim was to test primarily the candidate's capability, his ability to "make good" in the Academy, rather than his acquisitions of facts or rules. Ever since the first, this has been the ideal of the examiners. Following the practice of colleges, the Academy has increased its requirements as fast as our grammar schools and high schools have included more of the requisite subjects in their courses. It has never, however, been as free as the colleges to raise its standards.

Yet, notwithstanding the fact that in comparison with college requirements the entrance examinations of the Naval Academy are by no means difficult, there is often a demand for still lower standards. This has resulted, partly, from changes in the laws governing appointments to the Academy. From the apportioning law of 1845 to the present, the intent of each change in the law has been to make every district and territory of the whole nation, whatever its educational advantages may be, more certain of having its due representation in the Naval Academy and among the naval officers of the United States. The tendency always has been to widen for every American boy the door of opportunity. Reflected in each change there has been an instinctive effort on the part of our lawmakers to attain one of our democratic ideals, that of opening a career for the talents of every man. But neither the intent of equal representation nor the democratic ideal of career open to talent is regarded when unprepared candidates are nominated, and when, as a consequence, vacancies are left in more than a third of our districts. Both intent and ideal, however, could be approximately attained if the method already adopted by many members of the Congress were adopted by all. If every candidate for appointment to the Naval Academy were nominated only after a qualifying, competitive test, candidates would, as we have seen, be more successful, both in meeting the requirements for admission, and in completing the academic course.

NOTICE

The last installment of the article on Arctic Duty has been omitted from this number, but may appear at a later date.

U. S. NAVAL INSTITUTE
SECRETARY'S NOTES

Changes in the officers of the Institute Lieutenant Commander G. M. Ravenscroft was selected to relieve Lieutenant Commander I. C. Kidd as Secretary and Treasurer.

Dues The annual dues (\$2.50) are now payable. It is suggested that payment be made in lump sums to cover a period of two to five years; this method of payment is practiced by a number of members, both regular and associate, and has advantages for members as well as for the Institute.

In case of death or resignation, dues paid in advance, except for the current year, will be returned to estate or individual.

Address of Members *All members are urged to keep the Secretary and Treasurer informed of the address to which PROCEEDINGS are to be sent, and thus insure their receipt.*

This precaution is now of particular importance as notices of changes of station are not now available for the use of the Institute's staff.

Non-receipt of Proceedings Members and subscribers are urged to notify the Secretary and Treasurer promptly of the non-receipt of PROCEEDINGS, in order that tracers may be started. The issue is completed by the 10th of each month.

Member-ship Since November 17, 108 regular members and 11 associate members have joined the Institute.

Deaths:

Rear Admiral John Schouler, U. S. Navy, Retired.

Resignations: Three.

Book Announcements Attention is invited to the List of Publications for a complete catalogue of books revised and republished.

The Landing Force Manual, U. S. Navy, 1917, is being compiled by a board of officers and will be ready for distribution shortly after the compilation has been completed, probably March 15, 1918.

It is announced that the Manual of Wireless Telegraphy has been revised and will appear about February 15, under the title "Robinson's Manual of Radio Telegraphy and Telephony."

Seamanship Department Notes, U. S. Naval Academy, is ready for distribution.

Discount on Books. The five per cent additional discount allowed to purchasers of books whose accounts during a calendar month amounted to a hundred dollars or over has been discontinued.

Book Department The Institute Book Department will supply any obtainable book, of any kind, at retail price, postage prepaid. The trouble saved the purchaser through having one source of supply for all books, should be considered. The cost will not be greater and sometimes less than when obtained from dealers.

Suggestions Invited Comment and suggestions relative to the make-up of the PROCEEDINGS are invited from all members interested in the welfare of the Institute. It is believed that the scope of usefulness of the PROCEEDINGS to members can be increased and all members are invited to assist in this work. Should any topic, on which you think an article could well be written, occur to you, send it to the Secretary and Treasurer, together with such explanation or comment as may appear desirable in order that the intent of the suggestion may be clearly understood. The Institute is desirous of obtaining good "sea yarns" for publication. It is hoped that any one who can spin such a yarn will submit it.

The attention of authors of articles is called to the fact that the cost to them of reprints other than the usual number furnished, can be greatly reduced if the reprints are struck off while the article is in press. They are requested to notify the Secretary and Treasurer of the number of reprints desired when the article is submitted. Twenty copies of reprints are furnished authors free of charge.

Authors of articles submitted are urged to furnish with their manuscript any illustrations they may have in their possession for such articles. The Institute will gladly co-operate in obtaining such illustrations as may be suggested by authors.

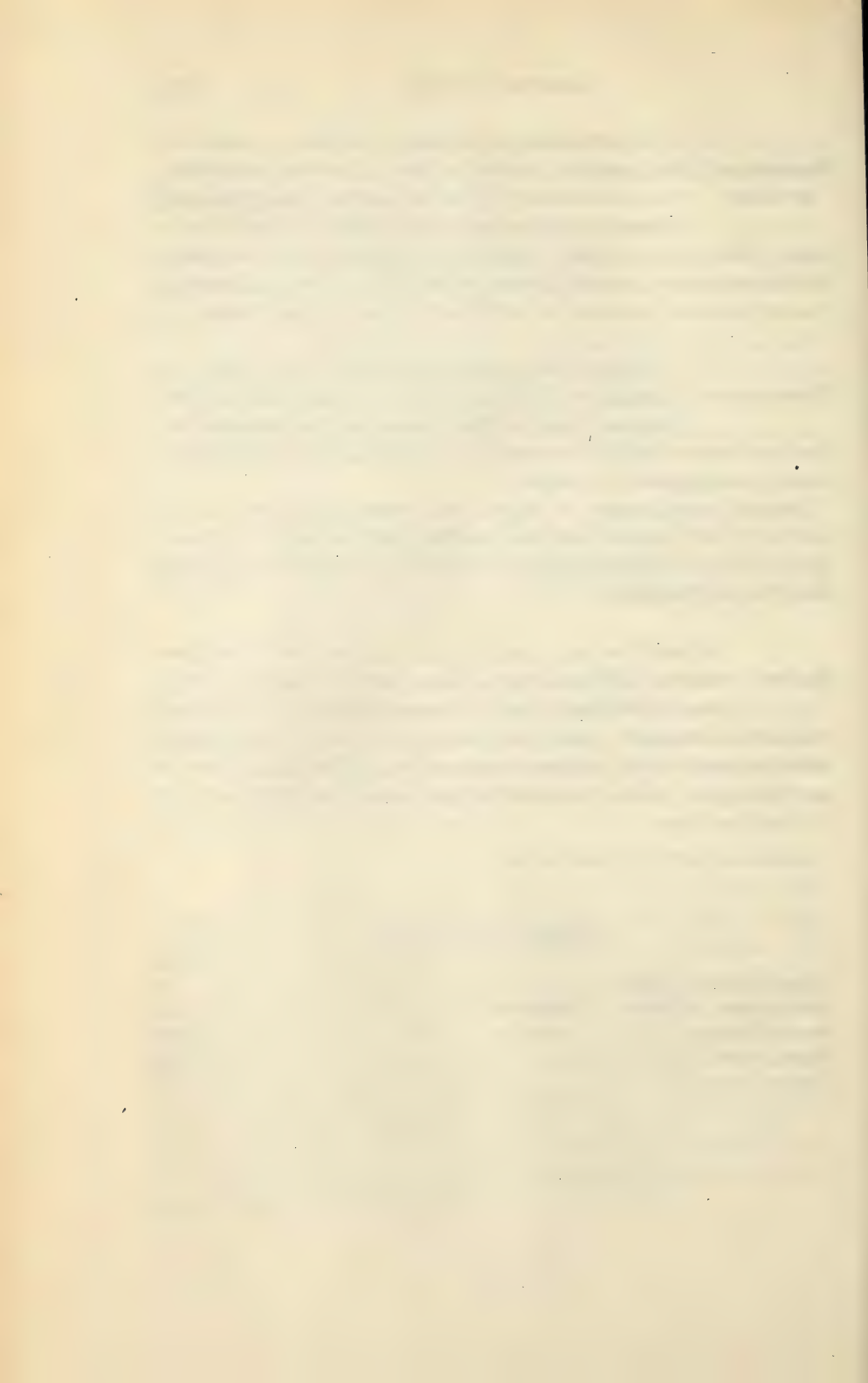
Original photographs of objects and events which may be of interest to our readers are also desired, and members who have opportunities to obtain such photographs are requested to secure them for the Institute.

Whole Nos. 145, 146, 147, 149, 155 and 166 of the Proceedings (March, 1913, June, 1913, September, 1913, January-February, 1914, January-February, 1915, and November-December, 1916) are exhausted; there are so many calls for single copies of these numbers that the Institute offers to pay for copies thereof returned in good condition at the rate of 25 cents per copy.

ANNAPOLIS, MD., December 22, 1917.

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UNITED STATES NAVAL INSTITUTE
ANNAPOLIS, MD.

REPORT OF AUDIT FOR THE YEAR ENDED DECEMBER 31, 1917

BALTIMORE, MARYLAND, January 7, 1917.

TO THE OFFICERS AND MEMBERS OF THE UNITED STATES NAVAL INSTITUTE,
ANNAPOLIS, MARYLAND.

Gentlemen:—We have audited the books of the *United States Naval Institute, Annapolis, Maryland*, for the year ended December 31, 1917, and submit herewith a certificate, one page of comments and the following exhibit and schedules:

Exhibit A.—Balance sheet as of December 31, 1917.

Schedule No. 1.—Statement of cash receipts and disbursements for the year ended December 31, 1917.

Schedule No. 2.—Investments.

Schedule No. 3.—Accounts receivable.

Schedule No. 4.—Certified checks.

Schedule No. 5.—Accounts payable all as of December 31, 1917.

Schedule No. 6.—Statement of income and expenses for the year ended December 31, 1917.

Respectfully,

BLACK AND COMPANY,

Certified Public Accountants,

By WILMER BLACK, C. P. A.

(*Member American Institute of Accountants.*)

UNITED STATES NAVAL INSTITUTE
ANNAPOLIS, MARYLAND

CERTIFICATE

We have audited the books of the *United States Naval Institute, Annapolis, Maryland*, for the year ended *December 31, 1917*, and

We hereby certify that the accompanying *balance sheet* and *statement of income and expenses* are correct; and, in our opinion subject to the attached comments, clearly set forth the true financial condition as of *December 31, 1917*, and result of operations for the year ended *December 31, 1917*, respectively, as disclosed by the books of account.

BLACK AND COMPANY,

Certified Public Accountants,

By WILMER BLACK, C. P. A.

(*Member American Institute of Accountants.*)

Baltimore, Maryland, January 7, 1918.

UNITED STATES NAVAL INSTITUTE
ANNAPOLIS, MARYLAND

COMMENTS ON THE AUDIT OF THE BOOKS FOR THE YEAR ENDED
DECEMBER 31, 1917

By referring to Exhibit A, Schedule No. 6, of this report, you will note how we have arrived at the Cost of Publications sold. In this amount we have included all items that are an actual part of the cost.

Our examination, which was very carefully made, disclosed no discrepancies or inaccuracies; one or two clerical errors were found and adjusted. The records, books, etc., show a painstaking and careful attention to details.

EXHIBIT A

BALANCE SHEET, DECEMBER 31, 1917

ASSETS

Current Assets.

Cash (in bank), Schedule No. 1.....	\$13,815.57
Investments, Schedule No. 2.....	64,000.00
Accounts receivable, Schedule No. 3.....	22,071.62
Inventory, December 31, 1917 (as taken by yourselves)	9,614.26
Certified checks, Schedule No. 4.....	10,041.00

Total current assets..... \$119,542.45

Balance \$103,351.10

Furniture and Fixtures..... 466.10

\$103,817.20

LIABILITIES

Current Liabilities.

Accounts payable, Schedule No. 5..... \$16,191.35

Total current liabilities..... \$16,191.35

Balance (excess of current assets over current liabilities) 103,351.10

\$119,542.45

Reserve Fund.

Balance, January 1, 1917..... \$7,563.14

Cash receipts 300.95

Transferred from general fund..... 30.00

7,894.09

(This fund by the constitution is composed of \$3050 originally credited to it, together with all life fees, which have been, or may hereafter be received, and the principal of this fund shall be held in perpetuity to guarantee the future interest of the life members.)

Surplus.

Balance, January 1, 1917..... \$73,615.82

Add: *Net profit* for the year ended December 31, 1917 (for details see Schedule No. 6)..... 22,307.29

95,923.11

\$103,817.20

EXHIBIT A.—SCHEDULE No. 1

STATEMENT OF CASH RECEIPTS AND DISBURSEMENTS FOR THE YEAR ENDED
DECEMBER 31, 1917

Balance, January 1, 1917..... \$20,364.54

RECEIPTS

Dues	\$5,622.69
Subscriptions	2,452.15
Sale of books purchased.....	2,554.30
Advertisements	1,204.96
Interest on investments.....	3,062.79
Postage	1,657.92
Binding	85.08
Life membership fee.....	300.95
Sale of extra publications.....	74,261.27
Sale of Proceedings.....	206.25
Certified checks	1,231.00
Overpaid	327.23
Stationery .....	.37
Expense .....	.88
Advertising	12.50

Total receipts 92,980.34

\$113,344.88

Balance, January 1, 1918..... \$13,815.57

DISBURSEMENTS

Printing and binding Proceedings.....	\$13,828.60
Printing and binding extra publications.....	45,978.12
Salaries	5,820.50
Contributors	3,938.75
Authors of books (royalties).....	1,765.65
Postage and telegrams.....	2,166.09
Expressage, freight and hauling.....	1,438.60
Board meetings	416.00
Purchase of books for sale.....	2,728.83
Office expenses—stationery, supplies, etc.....	755.75
Stationery	520.80
Advertising	284.10
Prize essay award.....	200.00
Certified checks	11,272.00
Honorable mention award.....	175.00
Engraving prize essay, medal and case.....	23.20
Overpayments	217.32
Purchase Liberty Loan bonds.....	8,000.00

Total disbursements \$99,529.31

Balance, December 31, 1917..... 13,815.57

\$113,344.88

Seaman's Bank for Savings, New York City.

Balance as per letter dated January 5, 1918..	\$3,000.00
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<i>Rhode Island Hospital Trust Co., Providence, R. I.</i>	
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Balance as per letter dated January 5, 1918..	3,570.78
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<i>Society for Savings, Hartford, Conn.</i>	
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Balance as per letter dated January 7, 1918..	3,695.50
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<i>Farmers' National Bank, Annapolis, Maryland</i>	
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Balance as per statement dated January 3, 1918	3,549.29
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	\$14,202.58
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Less Outstanding Checks.

#2747	\$ 2.50
2982	7.50
3171	1.80
3439	2.04
3498	1.50
3550	43.00
3656 .....	.50
3746	84.00
3752	8.00
3782	19.98
3813	6.23
3818	10.00
3822 .....	.60
3827	112.50
3829	4.50
3830	2.25
3831	4.00
3833	119.00
3834	56.00
3835	99.75
3836	31.50
3837	12.00
3839	10.50
3840	13.50
3843	5.00
3845	5.00
3846 .....	.60
3848	1.20
3849 .....	.30
3850	9.856.04
3851	75.00
3852	35.00
3853	20.00
3857	2.00

	\$10,653.29
--	-------------

	\$3,549.29
--	------------

	\$13,815.57
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EXHIBIT A.—SCHEDULE No. 2
SECURITIES (BONDS) DECEMBER 31, 1917

Face Value		Book Value
\$6,000	Southern Railway. 6 \$1000 5% registered gold bonds, #M257-247-475-476-477-478, due 7/1/1994.....	\$6,000.00
2,000	Washington Railway and Electric Co. 2 \$1000 4% 50 year gold bonds, consolidated mortgage, due 12/1/1951, #2183-2184.....	2,000.00
18,000	Northern Pacific and Great Northern R. R. 8 \$1000 joint bonds registered 4%, due 7/1/1921, #M13253-4-11171-13255-11172-11769-11770-11771; 2 \$5000 C. B. & Q. collateral registered 4%, due 7/1/1921, #V5199-5401	18,000.00
12,000	Northern Pacific Ry. 4 \$1000 3% registered gold bonds, #M1610-1-2-1650; 1 \$5000 3% registered gold bond, #1123; 3 \$1000 3% gold bonds, #M216543-4-5, general lien, due January 1, 2047	12,000.00
9,000	B. & O. R. R. Company. 1 \$5000 1st mtge. 4% 50 year gold registered, due 2/17/1960, #A436; 1 \$1000 1st mtge. 4% 50 year gold registered, due 2/17/1960, #M1230; 3 \$1000 prior lien 3½%, due 1925, #SM383-4-5..... (\$7,894.09 of these bonds belong to the Reserve Fund.)	9,000.00
2,000	Potomac Electric Power Co., 5%, due June 1, 1929, #833-4	2,000.00
7,000	New York City, registered 4¼%, due March 1, 1962, #588	7,000.00
5,000	3½% Liberty Loan bonds, registered, due June 15, 1947, #6033-4-5-6-7	5,000.00
3,000	4% Liberty Loan bonds.....	3,000.00
<u>\$64,000</u>		<u>\$64,000.00</u>

EXHIBIT A.—SCHEDULE No. 3
ACCOUNTS RECEIVABLE, DECEMBER 31, 1917

Back dues	\$1,253.00
Subscriptions	3.00
Advertisements	378.62
Extra publications	20,437.00
	<u>\$22,071.62</u>

EXHIBIT A.—SCHEDULE No. 4
CERTIFIED CHECKS, DECEMBER 31, 1917

Aug. 11.	Secretary of the Navy #3516.....	\$150.00
22.	" " " 3529.....	686.00
Oct. 1.	" " " 3618.....	1,125.00
3.	" " " 3636.....	250.00
22.	" " " 3667.....	3,155.00
31.	" " " 3683.....	2,490.00
Nov. 18.	" " " 3734.....	660.00
28.	" " " 3780.....	1,525.00
		<u>\$10,041.00</u>

EXHIBIT A.—SCHEDULE No. 5
ACCOUNTS PAYABLE, DECEMBER 31, 1917

Lord Baltimore Press.....	\$9,815.10
Longmans, Green and Co.....	3.46
Harper and Brothers.....	41.72
D. Van Nostrand Co.....	237.99
McGraw, Hill Book Co.....	12.75
R. Beresford	1.50
U. S. Infantry Ass'n.....	30.70
National Geographic Society.....	1.00
John Wiley and Sons.....	3.75
Barse and Hopkins.....	5.32
J. B. Lippincott Co.....	8.41
Putnam's Sons	2.69
Dodd, Mead and Co.....	1.94
Little, Brown and Co.....	3.28
Geo. H. Doran Co.....	1.18
Methodist Book Co.....	.73
E. P. Dutton and Co.....	5.05
Lemcke & Beuchner.....	4.50
Doubleday, Page and Co.....	2.39
N. W. Henley Pub. Co.....	.82
R. M. McBride & Co.....	2.39
McMillan Co.	6.47
Meyer and Thalheimer.....	24.20
Steckney and Montague.....	12.00
James Gantt	6.66
C. and P. Telephone Co.....	3.00
Underwood and Underwood.....	15.00
Phila. Mfgs. Mutual Fire Co.....	80.00
Postmaster, Annapolis, Md.....	3.91
Lucas Bros.	11.20
Black and Company.....	100.00
Wells, Fargo and Co. Express.....	50.47
Sundry authors (royalties).....	5,575.97
Sundry credits (overpayments).....	115.20

\$16,191.35

EXHIBIT A.—SCHEDULE No. 6

INCOME AND EXPENSES FOR THE YEAR ENDED DECEMBER 31, 1917

Inventory, January 1, 1917.

Extra publications	\$7,012.58
Extra numbers of Proceedings.....	300.00

\$7,312.58

Add: Purchases for year.

Books for sale.....	\$3,100.18
Printing and binding proceedings.....	14,154.26
Printing and binding extra publications..	51,707.44

68,961.88

\$76,274.46

Deduct: Inventory, December 31, 1917.

Extra publications	\$9,314.26
Extra numbers of Proceedings.....	300.00

9,614.26

\$66,660.20

EXHIBIT A.—SCHEDULE No. 6.—Continued

Expressage, freight and hauling.....	\$1,864.55
Contributors	3,938.75
Authors of books (royalties).....	5,039.72
Prize essay award.....	200.00
Honorable mention award.....	175.00
Postage and telegrams.....	489.84
Engraving prize essay, medal and case.....	23.20
	<hr/>
	\$11,731.06
<i>Cost of publications sold.....</i>	<i>\$78,391.26</i>
<i>Profit on sale of publications, etc.....</i>	<i>21,026.89</i>
	<hr/>
	\$99,418.15

EXPENSES

Salaries	\$5,820.50
Office expenses	721.13
Board meetings	416.00
Insurance	80.00
Stationery	543.85
Advertising	271.60
Life members	30.00
	<hr/>
<i>Total expenses</i>	<i>\$7,883.08</i>
<i>Excess of income over expenses transferred to surplus</i>	<i>22,307.29</i>
	<hr/>
	\$30,190.37

INCOME

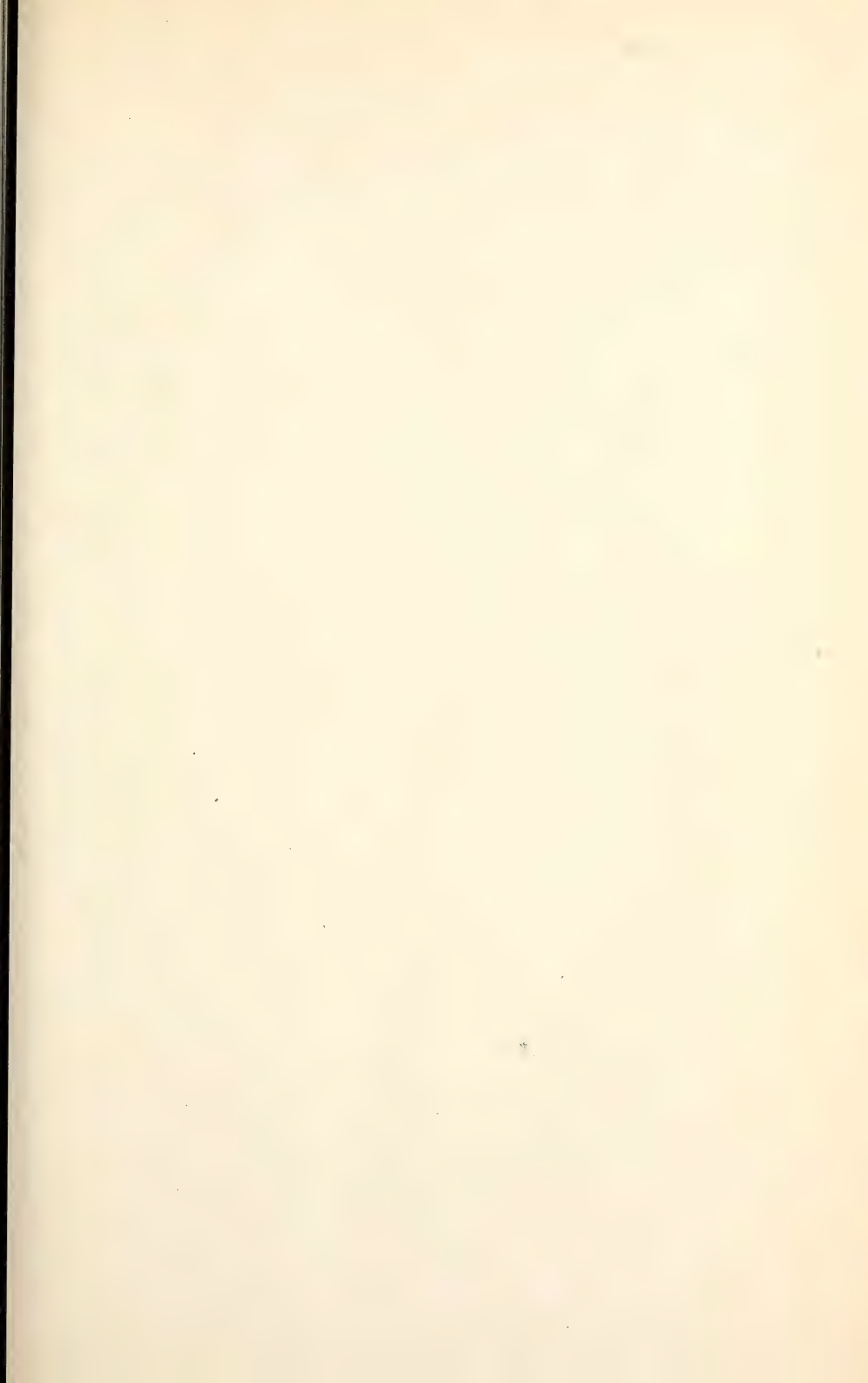
<i>Sale of extra publications.....</i>	<i>\$92,820.35</i>
<i>Sale of books.....</i>	<i>2,554.30</i>
<i>Sale of proceedings.....</i>	<i>206.25</i>
	<hr/>
<i>Total sale of publications.....</i>	<i>\$95,580.90</i>
<i>Subscriptions</i>	<i>2,390.05</i>
<i>Advertisements</i>	<i>1,362.12</i>
<i>Binding</i>	<i>85.08</i>
	<hr/>
<i>Total sale of publications, etc.....</i>	<i>\$99,418.15</i>
<i>Profit on sale of publications, etc.....</i>	<i>\$21,026.89</i>
<i>Dues</i>	<i>6,100.69</i>
<i>Interest on investments.....</i>	<i>3,062.79</i>
	<hr/>
	\$30,190.37

This report of audit was accepted and approved by the Board of Control, for publication, January 10, 1918.

I. C. KIDD,

*Secretary and Treasurer,
U. S. Naval Institute.*







BRITISH BATTLESHIP READY FOR ACTION IN THE ADRIATIC. SAND BAGS PROTECT TURRETS.

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PROFESSIONAL NOTES

PREPARED BY

LIEUTENANT W. B. JUPP, U. S. Navy.

GENERAL ARRANGEMENT

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VESSELS BUILDING.		
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NOTE.—Ship construction in the nations at war is held confidential and no reliable information is available.

ARGENTINA

PROTEST NEW BARRED ZONE.—A number of Argentina newspapers consider that the extension of the German barred zone to include the trade routes between South America and Europe is an unfriendly act toward that country. The papers renew their demands that the government sever relations with Germany.—*N. Y. Times*, 12/1.

GREAT BRITAIN

BIG INLAND HARBOR PLANNED BY BRITAIN.—For a considerable time there have been reports that the British Board of Admiralty had had before it definite plans for a big ship canal to join the firth of Clyde to the west coast of Scotland. These reports are now confirmed. They provide for a canal from the firth of Forth to Loch Lomond and thence out to Loch Long, an offshoot of the firth of Clyde, and so to the open sea. The Mid-Scotland Ship Canal National Association has been informed that the Admiralty is disposed to favor the Loch Lomond route on naval grounds. The association has been working hard for a long time past in favor of a canal by another route altogether.

At present the Loch Lomond route seems to be most in official favor. This route would take the canal from the firth of Forth, as far up as that estuary is navigable for large vessels, by way of low-lying ground to the southern end of Loch Lomond. The northern end of Loch Lomond is only separated from Loch Long by two or three miles of land, and it would be an easy matter to cut through these two or three miles and join the inland loch to the sea loch, and so to the firth of Clyde.

In order to make the waterway capable of carrying large war vessels it would be necessary to raise the level of Loch Lomond by about 22 feet and a number of locks would be required between Loch Lomond and Loch Long, as well as elsewhere on the canal. It would not be by any means a sea-level canal, and therein would lie one of its principal disadvantages.

The "direct route," on the other hand, would be from Grangemouth to a point on the River Clyde a few miles below Glasgow, and by it a canal would be on the sea level. No locks would be necessary anywhere, but there would have to be a "seagate" at either end, so that the rise and fall of the ocean tides would not affect the level of the canal. The Mid-Scotland Ship Canal National Association claims for this route many advantages as compared with the route by way of Loch Lomond. It would follow very largely, if not almost wholly, the line of the present Forth and Clyde barge canal, which in its turn follows the natural valley which joins the firths of Forth and Clyde. It would pass through or near the majority of the most important industrial areas in the Scottish midlands, and its western end would be right in the middle of the great Clyde shipbuilding area, to which war vessels could be taken from the new naval base at Rosyth for overhaul or repair.

Loch Lomond is a large and beautiful stretch of water, and if its level is raised by 22 feet it will provide sufficient depth for the largest of warships. It is likely that the authorities have in their minds the conversion of Loch Lomond into a great inland naval base, from which war vessels could emerge to either coast, as they might think fit. There is something remarkably attractive in the idea of having great squadrons of British battleships, battle cruisers, light cruisers, destroyers and submarines moored in absolute safety away up among the highland hills, far from the dangers of the ocean and also from the dangers of enemy attack, but ready at any moment to slip out either to the Atlantic or the North Sea. There is nothing impracticable in the idea, while there are no insoluble engineering difficulties.—*Washington Star*, 27/12.

SIR JOHN BECOMES PEER AND IS SUCCEEDED BY SECOND SEA LORD.—London, December 26.—Vice Admiral Sir Rosslyn Wemyss has been appointed First Sea Lord, in succession to Admiral Sir John R. Jellicoe, according to an official announcement issued this evening.

Vice Admiral Sir Rosslyn Wemyss was appointed Second Sea Lord of the British fleet last summer. He has a distinct reputation as a fighter of the first order throughout the British Navy. He was born in 1864.

He took a foremost part in the Jutland battle and acquitted himself admirably. He comes of one of the old conservative families of England, being a son of the late J. H. Erskine Wemyss, of Wemyss Castle, Fife. He entered the navy in 1877, was made a lieutenant in 1887, a commander in 1898 and captain in 1901. He was commander of the Royal Naval Barracks in 1911 and 1912, rear admiral of the second battle squadron in 1912 and 1913 and was an extra equerry to the King.

Vice Admiral Wemyss represents the old aristocratic element. As Second Sea Lord he was responsible chiefly for the appointment of the personnel of the navy, and he was undoubtedly taken as first assistant to Admiral Jellicoe because of his knowledge of men and his reputation as a fighter.—*N. Y. Herald*, 27/12.

NEW BRITISH WARSHIPS.—M. Rousseau, the naval expert of the *Paris Temps*, writes that on a visit to the yard of the Fairfield Ship-Building and Engineering Company, Ltd., Govan, he saw, with wonder and amazement, "the extraordinary dimensions of certain new British warships, beside which the size of the *Queen Elizabeth* and *Tiger* would seem very modest." Although complete discretion was observed, he adds that as to actual size one need only to remark that the slips on which these two earlier vessels had been laid down had to be enlarged to realize that the new types were bigger than the old.—*Nautical Gazette*, 3/1.

WHAT BRITISH SHIPS CARRY.—Ninety-one per cent of the tonnage of British ships is now reserved for war munitions, grain and other government supplies. Seven per cent is reserved for cotton, canned goods and other essential shipments. The remaining 2 per cent is unrestricted.—*Marine Journal*, 12/17.

MORE MEN FOR BRITISH NAVY.—A supplementary estimate issued on November 26 provides for the addition of 50,000 officers and men to the navy during the current financial year. The original number voted for 1917-18 was 400,000, so that, with the increase now asked for, the total strength will be raised to 450,000.

At the outbreak of war the establishment stood at 151,000 of all ranks.—*Army and Navy Gazette*, 12/1.

BRITISH NAME NAVAL BOARD.—The new Admiralty Board is announced officially. There is nothing sensational or dramatic about the list of names, and only one naval member of the board was not serving at the Admiralty when Admiral Sir John R. Jellicoe was the head. He is Rear Admiral Sydney R. Fremantle, who becomes deputy chief of staff to Vice Admiral Sir Rosslyn Wemyss, the new First Sea Lord.

Archibald S. Hurd, the naval critic, in commenting on the new board, says it is apparent that no revolutionary disturbance of the main lines of the naval policy is indicated. He adds that behind the new board is the reorganized war staff, for which some of the most brilliant younger officers have been chosen.—*Washington Post*, 13/1.

NEARLY 10,000 LIVES LOST ON BRITISH MERCHANT VESSELS.—It is announced that the number of lives reported as lost on British merchant vessels owing to enemy action from the beginning of the war until June 30 last is 9748.—*Marine Engineering*, January, 1918.

GERMANY

NEW GERMAN CRUISER.—On September 15 a Berlin telegram reported that a large cruiser had been launched at Danzig that day, and named the *Graf von Spee*, after the admiral who commanded the German ships in the action off Coronel, and was lost in the Falklands battle. Prince Henry of Prussia made the baptismal speech, and the widow of the late admiral, Countess von Spee, christened the vessel.—*Journal United Service Institution*, November.

NEW GERMAN SUBMARINES.—Early in September news from Copenhagen stated that Germany was in possession of a number of submarines of a new type, 340 feet in length, with a tonnage of 1500. It was said that they carried 40 torpedoes and a large number of shells and mines.—*Journal United Service Institution*, November.

LARGER GERMAN SUBMARINES.—According to advices received in this country from abroad, the impression prevails among British naval officers that the Germans have designed and constructed and are about to place in action an underwater craft of increased power, capable of vastly extended radius of action and endurance, with the expectation that these vessels will be capable of enlarging their zone of operation to American waters.

It is understood that the new submersibles are considerably larger than the *Deutschland* and can store enough oil to carry them 9000 miles or more, while they also can carry an abundant supply of torpedoes.

Moreover—and this is not their least important feature—the living quarters have been greatly improved. Each member of the crew has almost double the amount of cubic space that could be allotted in the earlier types, the ventilation is superior, and the broad decks enable the men to take exercise. It is doubtful if life on board a destroyer would be any more comfortable than on such a submarine.

That such a big, ocean-going submarine may prove an awkward customer is admitted, but it will not become particularly formidable until in the open sea, and even there the boat will not be as immune as the Germans seem to think. A submersible craft, whether a tiny coastal boat or a 3000 tonner, is subject to the same inherent limitations. If the boat is detected when submerged, the large one is equally at the mercy of the various devices that were devised for the destruction of the small boat, and the large one is under the same disadvantages during the brief interval that must elapse between changing from submersion to surface trim.

German writers lay great stress on the formidable armament of the new U-cruisers, which are reported to carry 6-inch guns, and they assume that with such an armament such a raider may boldly come to the surface and accept an artillery duel with any armed merchant ship or even with a destroyer. However, in the first place, it is doubtful whether 6-inch guns have been mounted on any underwater craft yet built, for there are technical difficulties to be overcome in connection with the mounting of really heavy guns in the submarines, and the best-informed authorities do not accept the German stories on this point.

It might be possible to devise an arrangement to carry a gun of 6-inch bore, but it would have to be a short, low-velocity weapon, which would be inferior in range to the standard 4-inch gun. It is well to remember that the latest 6-inch gun is more than 25 feet in length; also that the gun and its carriage are very heavy.—*Washington Post*, 6/1.

GERMANY'S NEW U-BOATS—A SPANISH DESCRIPTION.—On the supposition that anything throwing light on the construction and equipment of Germany's submarines will prove of interest, we publish a brief description translated from a Spanish weekly. The article makes the astonishing statement that the latest type of U-boat can go around the world without having to replenish its fuel supply—a statement which can hardly be accepted as authoritative. The article follows:

"The latest large German underseas boats are so well equipped that they are able to go around the world without having to replenish the fuel supply for their motors. The motor engines on these new U-boats have been so improved and have developed such a horsepower that they are in every respect equal to the type of engine now installed on fast cruisers.

"Other nations do not possess, so far as known, this novel and intricate class of engines, for they have been unable so far to connect up more than 1000 horsepower double-phase or quadruple-phase motors in 6-cylinder units, and to secure at the same time absolute safety of operation, combined with the maximum speed and power of endurance. The combustion motor

is just as capable of being kept in motion and of having its speed accelerated when under as when above water. The combustion gases are passed over a composition of calcium, whereby they lose their water and carbonic-acid contents. To the passive elements of these combustion gases there is then added so much oxygen as is necessary for perfect combustion. Naturally this oxygen has to be taken aboard in a very compressed form, and for this purpose flasks are used. In this method of propulsion a battery composed of flasks filled with oxygen takes the place of a storage battery.

"It can be easily seen that this system possesses no inconsiderable advantages as regards weight over the method of propelling submarines by electricity.

"However, the most important thing of all is that an almost noiseless motor has been created. Enemy vessels equipped with the most effective underwater sound detectors and such as will give warning of the approach of a vessel driven by ordinary motive power, even while it is a great distance off, and perhaps invisible, will pass by a submarine proceeding under water without being aware of the presence of the undersea boat. On the other hand, a German submarine, even when under water and not making use of its periscope, is promptly notified when a vessel is near at hand.

"Mention should also be made of the fact that thanks to the latest improvements, namely, through the employment of oxygen-flask batteries, the interior of a submarine is made a much more pleasant place of sojourn for those on board. They are no longer obliged to suffer from having to inhale poisonous vapors, combustion gases, and oil exudations, which formerly made life on a submarine almost intolerable, especially in cases of long cruises under water, or of enforced submersions for safety."—*Nautical Gazette*, 27/12.

ADDITIONAL SECRETS OF THE SUPER-ZEPPELINS.—With the dismantling of the Zeppelin *L-49* which was forced to land at Bourbonne-les-Bains and captured practically intact by the French on that eventful day when five or more German air raiders came to grief, further details concerning the construction and equipment are now available.

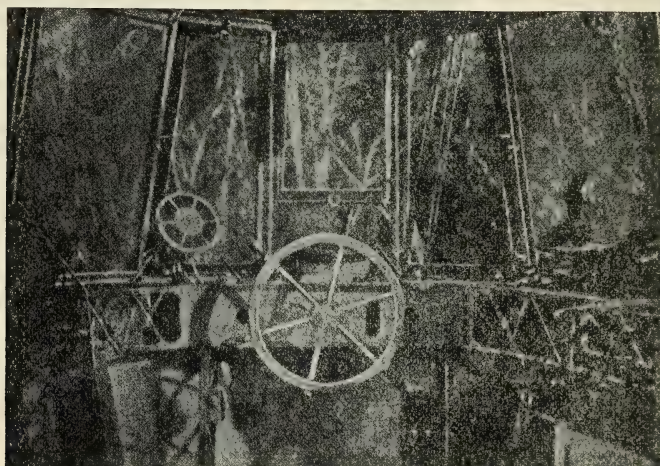
It is understood that the present intention of the French authorities is to exhibit the more interesting parts of the *L-49* at the Invalides in Paris, where so many war relics and trophies have been exhibited since August, 1914. Later the reconstruction of the gigantic German dirigible will be attempted; this task, it is now believed, will require several months of painstaking effort. At any rate, the dismantling operations have brought to light many details which were overlooked in the preliminary inspections of the craft, just after it had landed on a hillside.

The framework of the present super-Zeppelin contains three distinct varieties of aluminum, namely, pure aluminum, aluminum alloyed with zinc, and duralumin. The last-mentioned variety is a well-known alloy of copper, manganese, and about 93 per cent aluminum; and although its weight is about equal to that of pure aluminum, it has three times the tensile strength. The framework of the *L-49* has been estimated at 600 feet in length, 75 feet extreme diameter, and with a capacity of 55,000 cubic meters.

Along the bottom of the huge bag runs a triangular-shaped passageway walled in by a light metal framework, with its apex at the top. The gas bags fold over the triangular framework of this passageway, so that anyone passing through it is virtually surrounded by the gas bags on two sides and the aluminum framework and outer covering, surmounted by the footway, underneath. This gangway or "cat-walk" forms the keel of the big cigar-shaped bag, and serves to connect the various power plants and gun platform of the Zeppelin, with the forward or commander's quarters. The passageway is usually quite dark; but the footway is provided with a hand rail, while at intervals along the framework members small disks of radium

paint serve clearly to mark the way. Indeed, control dials and sign boards in the main passageway and the branch passageways are provided with radium dials and characters, making the use of dangerous lights unnecessary.

Aside from affording a means of communication between various parts of the aerial leviathan, the "cat-walk" serves as sleeping quarters and as storage space. The sleeping quarters are represented by a number of hammocks supported a few inches above the outer fabric cover, to one side of the pine board-walk. Fuel tanks and ballast tanks are suspended from the framework on either side of the board-walk, and it appears that the bombs are also supported in the passageway. The fuel reservoirs are



FRONT END OF THE COMMANDER'S QUARTERS OF THE ZEPPELIN
"L-49," SHOWING THE VARIOUS CONTROLS.

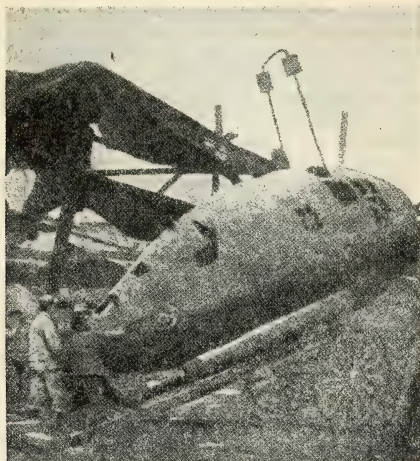
aluminum cylinders of 300-liter capacity, and are suspended in groups of two or three. Means are provided for readily releasing these tanks through trap doors in the bottom of the passageway, in the event that every pound of weight which can be spared has to be dropped to lighten the Zeppelin so as to ascend rapidly. Tubes connect the fuel tanks with the engines in the nacelles below, and aside from the main fuel tanks a number of others, not piped to the engines, are kept on hand as an emergency supply.

The ballast reservoirs which replace the former sand bags are made of waterproof cloth and provided with an aluminum spout at the bottom. Each ballast unit has a capacity of 1000 liters of alcoholized water, and it is of interest to note here that the freezing of this liquid ballast prevented the *L-49* from making for the higher altitudes to escape hostile battle-planes, after the gas supply had become seriously depleted through long flight. The ballast reservoirs are suspended from the framework of the "cat-walk" by means of steel cables.

Four nacelles house the engines—two laterally suspended near the center of the airship, and one near each end. The rear nacelle carries two motors, one of which is an emergency unit. In the former description of the *L-49* the statement was made that each nacelle carried two engines which could be employed singly or in tandem in driving the propeller. This statement, it now appears, only applies to the rear nacelle, all the other nacelles being

provided with a single engine and propeller. Each engine is rated at 240 horsepower, making a total of 1200 horsepower for the airship. Each propeller measures 5 meters in diameter. The nacelles, which are more or less egg-shaped, are occupied mostly by the engines, and it is reported that little space is left for the tenders; in truth, the crew in this respect are working under conditions no more enviable than sailors aboard a German U-boat.

The front nacelle is divided into two compartments, the forward or commander's quarters provided with sliding plate-glass windows in front; and the rear or engine room. The commander's quarters appears in one of the accompanying illustrations, and it will be noted that all the controls of the



ONE OF THE "POWER EGGS" OR NACELLES
READY FOR TRANSPORTATION.

huge airship are centered here. Among the instruments appearing in the view are a compass and the steering wheel in the center, the bomb-sighting apparatus at the right, with a tank of compressed oxygen just below, and the commander's parachute rolled up at the left. By means of a keyboard the cargo of bombs can be dropped one by one, while a battery of electric lamps shows which bombs have been released. A signal telegraph permits of instant communication with the various engine rooms.

That the present super-Zeppelin is a vast improvement over its predecessors is evident from a study of its lifting power, which is said to be 60 metric tons. This is distributed about as follows: Framework, 30 tons; two middle nacelles, 2 tons; two end nacelles, 4 tons; fuel for 24-hour flight, 7 tons; equipment and accessories, 1 ton; 19 passengers, $1\frac{1}{2}$ tons; bombs, 2 tons, making a total of $47\frac{1}{2}$ tons. This leaves a margin of 12 tons of lifting power, which is ample for all navigating conditions.

The crew comprises 19 men and two officers, who are posted as follows: Two in each of the middle nacelles, three in the rear nacelle which contains two engines, and four in the front nacelle. The remaining members are placed in the passageway or "cat-walk," where they take care of the ballast tanks or snatch a few hours' sleep until called upon to relieve other men. The crew of such a craft, it goes without saying, must be composed of exceptional men—men who can withstand extreme cold, lack of oxygen, and constant nervous strain.—*Scientific American*, 22/12.

U-BOATS UNDER SEPARATE BUREAU.—An imperial decree prescribing for the duration of the war the formation of the new section in the German Imperial Navy Department to be called the U-Boat Department has just been published, according to an Amsterdam dispatch to Reuter's, Limited. The new department deals solely with U-boat affairs, which heretofore have been handled by the dockyards section of the Navy Department.—*N. Y. Herald*, 17/20.

GERMAN MUTINIES.—More trouble in the enemy naval forces is reported. It is a curious thing that discontent in a military nation usually appears first in the navy. The Russian Navy is the latest example of this, the mutinies on the Black Sea warships being the first serious forerunners of successful revolutionary movements. Why this should be true is not clear. But possibly it is due to the fact that a warship is a separate unit: and that, once a crew is organized for trouble, it can pretty well pursue its own course. From the outside, it would seem as if a post on the Kiel fleet would be about as tempting a position as exists to-day in the armed forces of Germany. There is a minimum of danger and a maximum of leisure.—*Montreal Star*.

GERMAN NAVAL GUNNERY.—Russian newspapers recently to hand give interesting details of the naval engagement in the Gulf of Riga, arising out of the German attack on the Oesel, Moon, and Dagoe islands. It appears that the Russian battleships *Slava* and *Grazdanin* (ex-*Tzarevitch*) were engaged by a German dreadnought division, consisting of four ships of the *Kaiser-Koenig* class. The enemy opened fire at a range of 15,000 meters on the Russian ships, and upwards of 200 12-inch projectiles were discharged without scoring a single hit. Observing the ineffectiveness of their fire, the Germans closed the range to 12,000 meters, which was just beyond the range of the antiquated guns mounted in the Russian squadron. Out of a large number of salvos fired at this reduced distance the *Slava* was hit by two 12-inch shells. She sustained no vital injury, but a conflagration was caused, and under the vigorous German cannonade it was impossible to get it under. In the end the commanding officer of the *Slava* ordered the sea-cocks to be opened, and the ship went down with her colors flying, after the entire crew, including the wounded, had been transferred to destroyers. The *Grazdanin* was also hit several times, but was not seriously injured. Towards the close of the action the German ships came within range of the heavier Russian guns, which registered several hits. In this unequal action the German gunnery appears to have been very indifferent.—*The Engineer*, 7/12.

TERRIBLE CONDITIONS IN TOWNS OF GERMANY.—Chancellor von Hertling made his first appearance as a member of the Prussian cabinet in the Prussian upper house on Tuesday to support the housing bill. He said the conditions which had grown up around the large German towns and industrial centers were such as might fill the members of the house with serious anxiety, real pain and occasional sorrow. Not only had the maintenance of repairs to houses been impeded and the increase of housing facilities become almost impossible, but the government desires to provide homes for returning soldiers which will be adequate and healthy.

Dr. Dernburg, speaking on the same bill, said that the conditions in the large towns were terrible and must be abolished. The decline in the number of births had been very great and the mortality of children under 12 months had been still worse.—*Evening Star*, 17/1.

GERMAN DOUBTS U-BOAT SUCCESS.—Captain Persius, the German naval writer of the *Berliner Tageblatt*, takes a rather gloomy view of the submarine situation in his article of November 8. He says General Hindenburg on July 2 predicted that "the war is won for us if we withstand

enemy attacks until the submarine campaign has done its work." The only thing lacking, comments Captain Persius, is the submarine "work." Captain Persius says there seems to be little proof that England is being starved, making the trite remark:

"Just as the German people does not allow itself to be starved straight away, so it is with other peoples," and then he observes: "It may hardly be assumed that a scarcity of food will induce England to sue for peace in the next half year."—*Washington Post*, 23/12.

VON TIRPITZ FULL OF GLOOM.—A gloomy picture of Germany's future was painted by Grand Admiral Von Tirpitz in his recent speech in Essen, according to the *Hamburg News*. Regarding a successful economic war against Germany after the war, he said:

"Imagine the position if we simultaneously have to bear the burden of taxation which must fall on every German and, despite the fallen value of German money, we still have to buy the most necessary food and raw materials from abroad. Can anyone in his heart of hearts really believe that in these circumstances, without an increase of power, without indemnity and without security, we could avoid Germany's ruin?"

Germany's plight at the hands of England he bemoaned as follows:

"Not only has England taken our colonies and Mesopotamia, but everywhere she has made deeper and firmer bases for her maritime and colonial supremacy. She has tarnished and trodden down the prestige and honor of Germany by unprecedented calumnies. In the whole transatlantic world we are considered as conquered and done for."—*Baltimore Sun*, 29/12.

NEW KRUPP PLANT IN SWITZERLAND.—According to a dispatch from Geneva, Switzerland, the Krupps have opened a branch factory at Lucerne with a capital of \$7,500,000. Among the directors are Arthur Krupp and Counsellor Ernest Hauer, director of the principal Krupp factory at Essen. The Swiss law demands that when new enterprises are established in Switzerland their objects shall be set forth; and complying with this the company declares its purpose to be the fabrication of arms, cannon and munitions of war; the acquisition of factories, mines and metals, and also their sale. There is evidence that Germany realizes that the concentration of her munition and armor plants in the Essen district, which is only some 40 to 50 miles from the German frontier, is a permanent risk; and during the war, particularly during the latter phases, she has been developing large munition factories at points more remote from danger.—*Scientific American*, 29/12.

PROMISES KIND TREATMENT FOR AMERICAN PRISONERS.—The following statement has been issued by the Wolff bureau, the semi-official news agency in Berlin:

"The report is published from American headquarters that the Germans intend to treat American prisoners systematically worse than British, French and Italian prisoners, and is based allegedly on an official German statement that Americans are hard of understanding and unable to conduct themselves like gentlemen. Such an official statement was never made.

"American prisoners will be treated just as kindly and considerably as all other prisoners."—*Evening Star*, 9/1.

JAPAN

JAPAN'S SINGLE AIM.—While the eyes of the world are at present directed to United States shipping operations in the North Atlantic in rushing supplies and troops from this country to France to help win the world war, a glance at what is going on in the Pacific is enlightening, to

say the least. In 1914, for example, our trade with Japan amounted to \$158,000,000 in value. Of this, \$81,000,000 worth was carried in Japanese vessels. In the year just closed, our trade with Japan had increased to \$338,600,000, while the amount of exports and imports carried in Japanese vessels was \$529,000,000. In other words, vessels flying the Japanese flag carried *all of our trade with Japan* in 1917 and \$200,000,000 of our trade with other Far Eastern countries.

Anyone who has observed the Japanese policy in regard to her merchant marine since the outbreak of the European war is aware that that government has pursued without a single deviation the policy of creating a great merchant marine which would enable Japan to participate largely in the future control of the world's trade when the war is over. To this end ships to fly the Japanese flag have been built as rapidly as possible, and from the beginning of the war Japanese shipping has side-stepped the war zone. The Japanese steamship lines have not been commandeered by their government as have ours, and when the war is over they will be ready to go right on, while readjustment must be made in the United States from government to private control—another disadvantage for American shipping added to the many it is already laboring under when brought into competition with foreigners under normal conditions.

As a result of Japan's wise shipping policy, the Japanese Steamship Company announced recently that its capital will be more than doubled in the near future, from \$22,000,000 to \$49,000,000, and that it has plans in hand for building 50 vessels, mostly freighters, aggregating some 400,000 tons. It is the purpose of this company to extend its American and European passenger services, which plan is made possible by a permanent subsidy to be received from the Japanese Government. The increased capital will be in effect in March. Were we making the most of our present opportunity, similar announcements by American steamship lines would be forthcoming.—*Maritime Journal*, 12/1.

PORTUGAL

A MUTINOUS OUTBREAK ON THE PORTUGUESE BATTLESHIP *Vasco de Gama* was checked by artillery fire from a fort in Lisbon harbor after the warship had fired a few shots at the land battery, according to a government announcement, January 9.

The crew in part was landed and disarmed, surrendering to the army and the republican guard, and government forces later gained possession of the battleship.

Measures taken to insure the maintenance of order are declared to have been effective. The statement issued by the government reads:

"The *Vasco de Gama* having left the Santos docks against the government's formal orders and having taken a position in the Middle Tagus before Fort St. George, a battery in the fort opened fire on the cruiser, which replied with a few shots and then hoisted the white flag. Parts of crews of other ships landed some men from the crew who, after being disarmed, surrendered to the republican guard and the army on Commerce Square and at the naval arsenal.

"The government took immediate measures to insure the maintenance of order and the *Vasco* complied. The latter now considers the prevalence of order completely assured.

"The *Vasco de Gama* is already in the government's hands."

A revolution occurred in Portugal early in December, the government capitulating to the rebels after three days' fighting during which 70 persons were reported killed and between 300 and 400 wounded. A new government was formed under Dr. Paez, the revolutionary leader, and President Machado, of the republic, was banished. The movement appears to have been prompted by dissatisfaction with the alleged inefficiency of the old government. There had previously been numerous strikes and riots attributed

largely to food scarcity and high prices, and any monarchist influence in the uprising was denied. The new government pledged itself to continue cordial support of the cause of the Entente Allies.—*Baltimore American*, 10/1.

UNITED STATES

NAVAL VESSEL CONSTRUCTION.—Little has been done at the Navy Department in the matter of preparing new designs for warships of the larger classes, besides the accumulation of information derived from the experiences of the allied fleets that will be valuable when that work is taken up. This is because of the fact that the greater part of the naval construction next year will be confined to building destroyers, minesweepers and other small craft, which can be completed and placed in service in a shorter time and for which there is a continuing demand in the plans for meeting the submarine menace.

It is considered to be more advisable to adhere to this policy and suspend all work on the larger vessels, which will be pushed to completion later on when the rush of work on the smaller craft lessens.

Everything in the way of ship construction is being standardized as far as possible, in order to simplify the work and expedite completion. As rapidly as destroyers are placed in service and fitted out, they are being sent abroad, and in this connection officers that have commanded the older destroyers in foreign waters are returning to this country to take out the latest types.—*Washington Post*, 23/12.

THE DESTROYER BUILDING PROGRAM is making rapid progress. Through an agreement with the Shipping Board priority has been obtained for destroyer construction, the Navy Department in return affording priority for the construction of larger merchant ships, supplying ways and slips and permitting a delay in the building of larger naval vessels authorized by Congress. Parts of destroyers are being built in plants in all parts of the country, shipped to certain destinations when completed and there assembled, thus making possible the more rapid construction of the boats. The navy has not been seriously affected by the labor situation, which is causing distress to some industries. It is said that the navy yards have twice as many workmen employed now as they had a year ago, and that during the last six months they have made shipbuilders out of mechanics who before were not fitted for the construction of ships. Plants for the building of destroyers are being erected at several places, consisting chiefly of additions to existing plants, and it is hoped to have these soon in operation.—*Shipping*, 15/12.

U. S. SUBMARINE FLEET.—Chairman Padgett of the House Naval Committee, says that within a year the United States will have a submarine fleet as good as that of Germany or better.

"The number of submarines now under construction is a naval secret," he said, "and all that can be said is that the 138 which are being built under the authorization of the program of August, 1916, are only a part of the whole number."—*Evening Star*, 18/1.

SUBMARINE CHASERS TO BE COMPLETED BY MARCH.—Although the submarine-chaser program of the Navy Department has been delayed by slow delivery of engines, it was stated to-day, it will be completed by March 1. When the contracts were let it was believed the work could be done by January 1.

The number of boats involved has never been made public. A considerable number are already in service, however, some of them having been turned over to France and most of the remainder are more than 85 per cent completed. No more are to be built as they are regarded as useful only for inshore work.—*N. Y. Herald*, 15/1.

UNITED STATES NAVY.—Surveys of possible aviation, submarine and navy-yard sites south of Cape Hatteras and in the Gulf of Mexico, including Key West, recently were made by the navy-yard commission, of which Rear Admiral James M. Helm is chairman, and a final report of this commission, which also during the past year has investigated suitable locations for naval purposes in practically all sea-coast parts of the country, will be submitted to Congress some time this winter.

In its preliminary report, the board expressed the opinion that immediate steps should be taken to improve the navy yard at Charleston, S. C., so as to permit full utilization of its docking and repair facilities for work of all kinds within the limits of the capacity of the dry dock and the depth of the water that can be maintained, without undue annual expenditure, in the channel approaches from the sea.

Notwithstanding occasional damage from hurricanes, the board indicates the desirability of using the Pensacola yard as an aeroplane station, for which purpose it now is being employed. It is practically closed as an industrial yard for general service of the fleet, but the board recommends its additional limited development as a base for submarines and destroyers.

The board does not favor the development of the station at New Orleans as a first-class naval base, but believes that it has possibilities as a naval station for the repair and maintenance of light-draft vessels operating in the Caribbean Sea and Gulf of Mexico, especially as a base for submarines, destroyers and auxiliary vessels in time of war.—*Washington Post*, 17/12.

NEW RECORD BY DESTROYER.—A new record for sustained endurance has been established by one of the new "flush-deck" destroyers, the Navy Department announced, January 16.

The voyage was from a Pacific to an Atlantic port and occupied 10½ days, the average speed being 19.15 knots. A new record also was set in the construction of the destroyer, only 51 weeks elapsing from the laying of her keel to the date of launching.—*N. Y. Times*, 17/1.

SECRETARY DANIELS ON THE NAVAL FLYING CORPS.—In his report to the House Sub-Committee of the Naval Affairs Committee as well as in the discussion which followed, Secretary of the Navy Daniels gave the following information regarding the expansion of the Naval Air Service:

The increase in the naval aircraft material has been approximately 1400 per cent; in personnel, 3000 per cent; in stations and training schools, 3200 per cent, and better results are steadily obtained. An estimate of 10,000 machines and 5000 aviators is well within the correct number to be expected for next spring.

The naval aircraft factory at Philadelphia which was completed within 90 days, is about 400 feet long and has a floor space of approximately 140,000 square feet. It is expected to produce something like 1000 machines a year of the smaller type, or perhaps one-half that number of the larger type, when in full operation. In addition to relieving other manufacturers for army work, the naval aircraft factory will conduct experimental work. The production end will also supply the navy with correct figures as to the cost of machines and so protect the service as to expenditures.—*Aviation*, January.

U. S. NAVY

PRaises BUREAU OF NAVY ORDNANCE.—The war activities of the Navy Department, especially the preparations made by the Ordnance Bureau, under Rear Admiral Ralph Earle, are told in detail, so far as is consistent with military policy, in a statement made, January 13, by Representative William B. Oliver, chairman of the special committee investigating the work done by the navy in the war. The statement is based to a great extent on

the testimony given before the committee in executive session by Rear Admiral Earle and Commander Thomas A. Kearney, assistant chief of the bureau.

Representative Oliver prefaced his summary of the accomplishments of the Navy Department with the statement that the committee had been so impressed by the activities of the Ordnance Bureau that it had directed him to make a summary of what had been ascertained in the hearings, most of which were held behind closed doors.

Since the war began the expenditures of the bureau have increased from \$3,000,000 a year to more than \$560,000,000, and the experts have been called upon to develop new materials and inventions. More than 1100 vessels, the statement says, have been equipped with armor and armament since the fitting out of the *Campana*, on March 14, 1917.

While the Ordnance Bureau of the War Department refused to approve the Lewis gun, the navy's Ordnance Bureau conducted a test of this weapon in April, 1917, and as a result ordered several thousand of these guns. The second detachment of marines which left for Europe was entirely outfitted with the Lewis gun, and "recent reports from the war zone indicate that this gun is giving entire satisfaction."

Representative Oliver's summary of the important activities of the navy follows:

The importance of the readiness and adequacy of the navy's ordnance cannot be over emphasized. Upon this efficiency depends the success of our overseas operations. Guns that will shoot straight, shells that will penetrate the thickest armor, powder that is dependable are the essential requisites of naval supremacy. Ships and men without guns and ammunition are useless.

The bureau, so far as could be learned, has fully satisfied the demands made upon it by the vessels operating in European waters. A letter from Vice Admiral Sims compliments the work and spirit of the Ordnance Department. Other officers in the war zone, writing in similar vein, have given like testimony.

As a preliminary to its hearings, the committee visited the offices of the Bureau of Ordnance and personally examined into the organization and operation of the bureau's administrative details. The committee was most favorably impressed with the business organization, capacity, and capabilities of the bureau to handle expeditiously and efficiently the important war work that comes under its immediate cognizance—the procurement of guns, mounts, shells, powder, fire-control instruments, and the numerous accessories required in the arming of our naval forces.

The organization of the bureau in time of peace had been developed so as to make it an organization for war, with the result that, notwithstanding the enormously increased demands and responsibilities recently placed upon it, that organization is working smoothly and efficiently, notwithstanding the fact that the expenditures have increased from about \$3,000,000 to more than \$560,000,000. It has gradually been augmented by taking into it retired officers, officers of the naval militia, officers of the coast-guard service, former graduates from Annapolis, and able men from civilian life as needed.

Despite the pressure placed upon the bureau by the demands for more ordnance material of standard type, it has been able to develop much new material, including large depth charges, new submarine bombs, non-ricochet shells, bomb-dropping sights, howitzers, guns for throwing depth charges, smoke-screen apparatus, heavier ordnance on aircraft, and many other important designs which the bureau feels it unwise to disclose, and made much progress on essential articles of lesser importance.

Where there were shortages in the market of various materials, the bureau took steps immediately to develop new sources of supply. It placed contracts rapidly, and the committee is confident that the navy's needs for

ordnance during this war are fully covered by existing contracts and with the capacity now under its control.

Over 1100 vessels have been furnished and equipped with guns, ammunition, spare parts, and all their auxiliaries since the fitting out of the *Campana*, the first ship to be so fitted out, on March 14, 1917.

Reserves of ammunition and shell have been acquired; and money placed at the disposal of the Bureau of Ordnance, the committee finds, has been spent wisely and has been obligated practically as soon as it became available. The testimony convinced the committee that the prevalent belief and opinion as to the navy's readiness was well founded. The Bureau of Ordnance had for years been preparing for war.

Guns, mounts, shell, powder, and ordnance equipment in large quantities had been manufactured and held in readiness for eventual use. With the declaration of armed neutrality, guns and ammunition were promptly placed on the merchant ships of the United States. Upon the declaration of war, telegrams long held in readiness were put on the wire and the wheels were in motion—without a jar the machinery took up the load placed upon it. There has been no breakdown, no let-up. On the contrary there has been increasing speed and greater momentum.

New capacities have been developed for the production of gun forgings and the larger types of broadside gun mounts; firms that prior to the declaration of war had been engaged solely in commercial work have been induced to specialize in ordnance production with most gratifying results. Practically all the contracts made by the Bureau of Ordnance have been on a fixed-price basis as the result of competitive bidding, less than 10 per cent being on a cost plus a fixed-profit basis; cost being as defined by the internal revenue act, and the profit being per pound of gun forgings, or per gun, or per mount.

The navy's industrial ordnance plants have been and are being expanded as rapidly as practicable without interfering with their production. The results of much of this expansion will be felt this spring in the increased deliveries of all types of ordnance material. Without direct control of the gun factory, torpedo station, naval proving ground, powder factory, and ammunition depots, the work accomplished would have been impossible.

It may be pertinent to here state that the bureau has furnished in appreciable quantities the governments of England, France, and Italy with guns from the largest to the smallest caliber, together with proper supplies of ammunition therefor, and is continuing the supply of such munitions to our Allies. In addition to vessels of the regular navy of our Allies, it has armed a considerable number of their merchantmen.

Anticipating the needs of the naval service and Marine Corps for additional machine guns, the bureau wisely conducted a test of the Lewis machine gun early in April, 1917, with a view to definitely determining its serviceability when using the United States small-arms ammunition, and as a result of this test, placed an order for the manufacture of several thousand of the guns. Each company of marines leaving for foreign service has been provided with its proper quota of machine guns, the second detachment being entirely outfitted with the Lewis infantry machine gun, and recent reports from the war zone indicate that this gun is giving entire satisfaction.

Depth charges, which the committee thinks may be properly termed "the terror of the submarine," have been produced in quantity, and are in use by our destroyers and submarine chasers. An adequate reserve of ammunition for all classes of guns has been accumulated, and is held in storage ready for the use of the fleet.

It was specially gratifying to note that the skill, ingenuity, and inventive resources of the bureau have been productive of new designs demanded by the present methods of modern warfare. Advantage has been taken of every suggestion, irrespective of its source. Intimate contact has been established and maintained with the ordnance bureaus and fleets of the

allied nations, the greatest freedom of interchange of information and material being the order of the day. The relationship with army ordnance, Signal Service, Aircraft Production Board, and the Shipping Board has been most intimate and cordial.

The committee was gratified at the executive ability shown by naval officers placed in charge of industrial work. As an illustration, the bureau found it necessary to commandeer a plant producing binoculars and other optical instruments for the navy. Under the former management this plant produced but 168 standard binoculars in two months, whereas during the first two weeks of operation under navy management it has produced 600 satisfactory binoculars for the use of lookouts and for spotters.

The committee made special inquiry as to the damage done to torpedoes at the Bliss works. It ascertained that no torpedoes or damaged parts had found their way into service, that spare parts for torpedoes, such as gyro wheels, had been tampered with, but this was promptly detected by the naval inspector of ordnance and a close watch was maintained upon these articles, with the result that the perpetrator of the damage, one Paul Charles Hennig, a native of Leipzig, Germany, who had been in this country since 1908, has been arrested and is now awaiting trial.

Slight cuts by files had been made in the glass-hardened steel bearings for gyro wheels, and in other cases emery had been placed in bearings and bearing cups. Some fifteen gyro wheels in all were damaged. Exhaustive inspections were made of naval torpedo material, with the result that none of the damaged parts is in any completed torpedoes, either in storage or on board ship.

The committee found that, despite the necessity of placing large emergency orders for material, every effort has been made to insure reasonable prices.

The committee was supplied with full information of how many attacks of submarines upon armed merchantmen had been warded off by the ships' gun crews using the battery with bravery and skill and was given the details of certain engagements of special interest.

The arming of merchantmen and the use of other devices, including sailing in convoys, while doing much to keep down our percentage of losses, are not all that can be desired as a check to the submarine menace. The committee was furnished with the names, tonnage, and armament of all vessels under the American flag engaged in transatlantic trade, together with dates and incidents of all encounters with submarines. The record of attacks on our armed merchantmen shows a comparatively small percentage were successful and that the chances of escape when a submarine is sighted, before she has time to fire a torpedo, are very high, due to the efficiency of the navy personnel.

The unseen torpedo is responsible for 80 per cent of the sinkings.

Admiral Earle referred to the estimates which the secretary had furnished the committee for certain projects that will increase the efficiency of the navy's Bureau of Ordnance, and when these needs are provided the committee had unquestioned faith in its ability, its officers, and personnel to meet the growing demands and responsibilities which the war has imposed upon them.—*N. Y. Times*, 4/1.

NAVAL INCREASE.—Secretary of the Navy Daniels, in testifying before the sub-committee of the Naval Affairs Committee, declares that the navy now has more than 1000 ships in commission as against 300 two years ago, and an enlisted personnel of 280,000 officers and men compared with 64,680 men and 4376 officers when America declared war.—*Literary Digest*, 5/1.

NAVAL EXPANSION.—Some idea of the efficiency of the Navy Department and how it has met the extraordinary demands of the present war crisis can best be gained from the utterances of the Secretary of the Navy in his annual report and before the investigating committee of Congress. From

a force of 4500 officers and 68,000 men enlisted in January, 1917, the navy has expanded to 15,000 officers and 254,000 enlisted men. Further expansions are inevitable. A year ago the navy had 130 stations of all kinds; it has now 363. The number of employees at regular navy yards has increased from about 35,000 to over 60,000. On shore and afloat the naval establishment embraces more than 300,000. At the beginning of the fiscal year 1917 the monthly expenditures for all naval purposes were about \$8,000,000 (£1,640,000); they are now about \$60,000,000 (£12,300,000). A year ago there were 300 naval vessels of all kinds in commission; to-day there are considerably more than a thousand. These typical figures sufficiently indicate the task the navy has had to accomplish in the way of expansion.

The ability of the navy, without friction or hurrying, to bring to bear its military force rapidly and to increase it threefold in a short time, is credited by the Secretary of the Navy to the system that had been built up in peace times and to the securing before the war of a larger building program extending over a term of years, as well as to the authorization of an increased personnel. Internally the efficient organization, working together for years as a trained team, made the Navy Department's rapid expansion easy, though it taxed the strength and energy of every department head and the entire personnel on shore and in the fleets. It goes without saying that such satisfactory progress in the fighting strength of the navy could not have been accomplished without corresponding efficiency in the business affairs of the department, and it is largely due to the improved business methods and purchasing systems developed that the Navy Department has been able to meet the tremendous and sudden demands of war and embark upon such unprecedented programs of construction and equipment without breaking down the business machinery of the department.

Secretary Daniels' message to the American people that "the navy has met its duties of the present and is preparing for those of the future" will be received with confidence and no interference with the efficient work of this branch of the government will be tolerated.—*Marine Engineering*, January.

RESTORED TO SERVICE 109 BADLY DAMAGED INTERNED SHIPS.—All the damage done to 109 German ships by their crews, prior to their seizure by the United States Government when war was declared, has been repaired and these ships are to-day in service, adding more than 500,000 gross tonnage to the transport and cargo fleets in war service for the United States.

There is evidence that a German central authority gave an order for destruction on these ships, effective on or about February 1, 1917, simultaneous with the date set for unrestricted submarine warfare and that the purpose was to inflict such vital damage to the machinery of all German ships in our ports that none could be operated for from 18 months to two years.

This purpose has been defeated in signal fashion. In less than eight months all the ships were in service.

The destructive campaign of the German crews cunningly comprehended a system of ruin which they believed would necessitate the shipping of new machinery to substitute for that which was ruthlessly battered down or painstakingly damaged by drilling or dismantlement. There is documentary proof that the enemy believed the damage irreparable.

To obtain new machinery would have entailed a prolonged process of design, manufacture, and installation. Urged by the necessity of conserving time the engineers of the Navy Department succeeded, by unique means, in patching and welding the broken parts and replacing all of the standard parts which the Germans detached from their engines and destroyed or threw overboard.

The mechanical evidence is that the campaign of destruction was operated on these ships for more than two months and that the Germans

were convinced that they were making a thorough job of it. Their scheme of ruin was shrewdly devised, deliberately executed, and it ranged from the plugging of steam pipes to the utter demolition of boilers by dry firing.

When the United States Shipping Board experts first surveyed the ruin the belief was expressed that much new machinery would have to be designed, manufactured, and installed, making 18 months a fair minimum estimate of the time required. However, at the Navy Department, where the need of troop and cargo ships was an urgent issue, officers of the Bureau of Steam Engineering, having faith that the major portion of the repairs could be accomplished by patching and welding, declared it was possible to clear the ships for service by Christmas, and the last of the fleet actually took her final sea test and was ordered into service as a Thanksgiving gift to the nation.

To accomplish this end the Navy Department secured the services of all available machinery welders and patchers, many of them having been voluntarily offered by the railroads.

Although explosives were not used in the process of destruction, the engineers of the Navy Department were always conscious of the danger of hidden charges of high explosives which might become operative and disastrous when the machinery was put to a test. Instances of artful pipe plugging, of concealing steel nuts and bolts in delicate cylinders, of depositing ground glass in oil pipes and bearings, of cunningly changing indicators, of filling fire extinguishers with gasoline and similar means of spoliation, were common enough to induce the engineers to make a rule calling for thorough overhauling. On each ship there was no boiler that was not threaded through every pipe for evidence of plugging, no mechanism of any sort that was not completely dismantled, inspected, and reassembled before it was finally passed as safe.

A memorandum written in German was picked up on one of the ships which gave a complete record of the destruction on that ship. Investigation revealed that the list, which had evidently been left through an oversight, was correct in every detail. The following is a translation of excerpts from this memorandum:

"Starboard and port high-pressure cylinder with valve chest: Upper exhaust outlet flange broken off (cannot be repaired)."

"Starboard and port second intermediate pressure valve chest: Steam inlet flange broken off (cannot be repaired)."

"First intermediate pressure starboard: Exhaust pipe of exhaust line to second intermediate pressure flange broken off (cannot be repaired)."

"Starboard and port low pressure exhaust pipe damaged (cannot be repaired)."

The parenthetical optimism of the German who was so confident of the thoroughness of his mutilation is now the source of much glee among naval engineers, inasmuch as every one of the supposedly irreparable parts was in fact speedily repaired and those engines are to-day as powerful and serviceable as when they left the hands of their makers.

The method of patching and welding broken marine engines had never before been practiced, although the art has been known in the railroad industry for 15 years. Three methods of patching were used; electric welding, oxy-acetylene welding, and ordinary mechanical patching, the latter often later being welded. Following the repairs tests of the machinery were first made at the docks, where the ships were lashed firmly to the piers while the propellers were driven at low speed and later each ship was taken to sea for vigorous trial tests. The patches and welds were reported as having given complete satisfaction.

When the *Leviathan*, formerly the *Vaterland* and the largest ship afloat, was put into commission by the United States Government and sent to sea for a trial run, her commander, a young American naval officer, was ordered to "exert every pound of pressure that she possesses, for if there is any fault we want to know it now." The *Leviathan* stood the test. She was one of the ships least mutilated, due to the fact that she was in bad

repair and it was believed that she would not be fit to put to sea for many months. The navy engineers found it necessary to overhaul and partially redesign and reconstruct many important parts of the engines.

The larger German ships which have been repaired and are to-day in commission as a part of the United States Navy, with their former German and their new American names, are as follows:

German Name	American Name
Vaterland	U. S. S. Leviathan.
Amerika	U. S. S. America.
Andromeda	U. S. S. Bath.
Barbarossa	U. S. S. Mercury.
Breslau	U. S. S. Bridgeport.
Cincinnati	U. S. S. Covington.
Frieda Leonhart	U. S. S. Astoria.
Frederic der Grosse	U. S. S. Huron.
Geier	U. S. S. Schurz.
George Washington	U. S. S. George Washington.
Grosser Kurfurst	U. S. S. Aeolus.
Grunewald	U. S. S. Gen. George W. Goethals.
Hamburg	U. S. S. Powhatan.
Hermes	U. S. S. Hermes.
Hohenfelde	U. S. S. Long Beach.
Keil	U. S. S. Camden.
Kaiser Wilhelm II	U. S. S. Agamemnon.
Koenig Wilhelm II	U. S. S. Madawaska.
Kronprinz Wilhelm	U. S. S. von Steuben.
Kronprinzessin Cecilie	U. S. S. Mount Vernon.
Leibensfels	U. S. S. Houston.
Locksun	U. S. S. Gulfport.
Neckar	U. S. S. Antigone.
Nicaria	U. S. S. Pensacola.
Odenwald	U. S. S. Newport News.
Praesident	U. S. S. Kittery.
Praesident Grant	U. S. S. President Grant.
Praesident Lincoln	U. S. S. President Lincoln.
Prinzess Irene	U. S. S. Pocahontas.
Prinz Eitel Friedrich	U. S. S. Dekalb.
Rhein	U. S. S. Susquehanna.
Rudolph Blumberg	U. S. S. Beaufort.
Saxonia	U. S. S. Savannah.
Staatssekraetar Solf	U. S. S. Samoa.
Vogensen	U. S. S. Quincy.

The ships taken over and repaired by the Shipping Board, with their German and American names, are as follows:

German Name	American Name
Allemannia	Owasco.
O. J. D. Ahlers	Monticello.
Adamsturm	Actæon.
Arnallas Vinnon	Chillicothe.
Atlas	(No name.)
Armenia	(No name.)
Arcadia	(No name.)
Andalusia	(No name.)
Adelheid	(No name.)
Bulgaria	(No name.)
Borneo	Nipsic.
Bohemia	Artemis.
Bochum	Montpelier.
Bavaria	(No name.)
Calabaria	(No name.)

German Name	American Name
Carl Diederichsen	Raritan.
Clara Jebben	Tioga.
Clara Mennig	Yodkin.
Cobelenz	Sachem.
Constantia	(No name.)
Dobek	Monongahela.
Darvel	Wamsutta.
Elmshorn	Casco.
Elsass	Appelas.
Esslingen	Nyanza.
Farn Gerraux	Farn Gerraux.
Gouverneur Jaeschke	Watoga.
Holsatia	Tippecanoe.
Harburg	Pawnee.
Indra	Tonawanda.
Johanne	Iosco.
Koln	Anphion.
Kurt	Mochulu.
Loongmoon	Coosa.
Lyeemoon	Quantico.
Mark	Suwanne.
Mia	Oconee.
Magdeburg	Neuse.
Mattador	Montauk.
Marudu	Yazoo.
Nassovia	Isonomia.
Neptun	Minnow.
Ottawa	Muscoota.
Olivant	(No name.)
Ockenfels	Pequot.
Prinz Eitel Friedrich (Hamburg-American Line)	Ostewgo.
Prinzess Alice	Matoika.
Pennsylvania	Manasemond.
Pisa	Ascutney.
Pongtong	Quinnebaug.
Portonia	Yucca.
Prinz Joachim	Moccasin.
Prinz Oskar	Orion.
Prinz Sigismund	General Gorgas.
Prinz Waldemar	Wacouta.
Pommern	Rappahannock.
Rajah	Rajah.
Rheatia	Black Hawk.
Sachsen	Chattahoochee.
Sachsenwald	General Ernst.
Sambia	Tunica.
Savoia	General Hodges.
Serrapis	Osage.
Setos	Itasca.
Staatssekretar Kraetke	Tacony.
Steinbek	Arapahoe.
Suevia	Wachusett.
Camilla Rickmers	Ticonderoga.
Tsin Tau	Yuma.
Jubingen	Seneca.
Wasgenwald	Wasgenwald.
Wiegand	Midget.
Willehad	Wyandotte.
Wittekind	Iroquois.

Every one of these ships was found to be either deliberately damaged or rendered useless through the ravages of neglect before they fell into the hands of the United States Government.

The most serious typical damage was done by breaking cylinders, valve chests, circulating pumps, steam and exhaust nozzles on main engines, and by dry firing boilers and thus melting the tubes and distorting the furnaces, in at least one instance probably using thermit to make the destruction complete.

There were many instances of minor and easily detectable destruction, such as cutting piston and connecting rods and stays with hack saws, smashing engine-room telegraph systems, and the removal and destruction of parts which the Germans evidently believed could not be replaced. The most insidious sabotage was that which was concealed. In plugging a steam-pipe the method was to disjoin the pipe and insert a solid piece of brass which would be sawed off flush with the joint. The pipe would then be reconnected, showing no evidence of having been tampered with.

Indicators were astutely reversed in many instances. Numerous fire extinguishers were found to be filled with kerosene and gasoline. Piles of shavings and refuse were strewn about where fires might be started, open cans of kerosene being found in several of these incendiary traps. There had evidently been a plan to burn the ships under certain conditions and it is believed that the German crews were seized and interned somewhat in advance of their expectations.

The case of the *Vaterland* was quite different from that of any other ship. Engineers of the Navy Department who examined the big liner declared that inferior engineering had been practiced in her construction. She has four turbine engines ahead and four astern on four shafts. All of the head engines were found in good condition and all of the astern engines were found damaged.

The major portion of the damage was credited more to faulty operation than to malicious intent. Cracks were found in the casing of the starboard high-pressure backing turbine of such size as to make it certain that the engine had not been used on the vessel's last run. Certain documentary evidence found on the ship corroborated this belief. It also indicated that the *Vaterland* on her last trip had made less than 20 knots.

There was just enough evidence of mutilation to warrant full investigation, and the vast mass of machinery, electric apparatus, and piping in the *Vaterland* was patiently and doggedly examined before she was sent to sea. Original defects in her engine equipment were corrected, she was overhauled and in many respects refitted, and on the whole she was declared a better ship when she entered the service of the United States than when she took her maiden voyage.—*Official Bulletin*, 31/12.

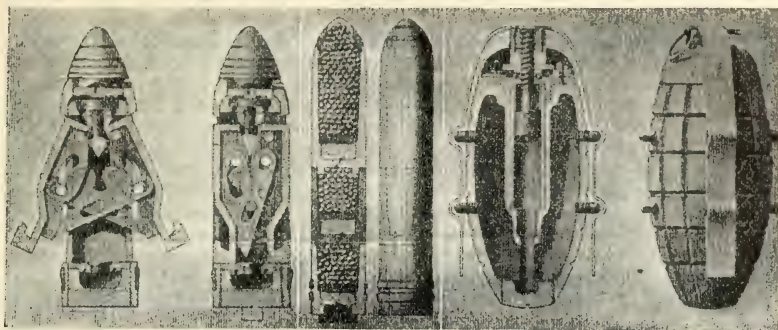
ORDNANCE AND GUNNERY

INVENTIONS WHICH MEET THE NEEDS OF MODERN WARFARE.—Because of the extensive employment of machinery in the world war, the inventor has the opportunity as never before to serve his country in his own favorite way. For the struggle in which we are now engaged has long been recognized as a contest between the great minds of the Central Powers and the Allied Powers—between inventors of both camps.

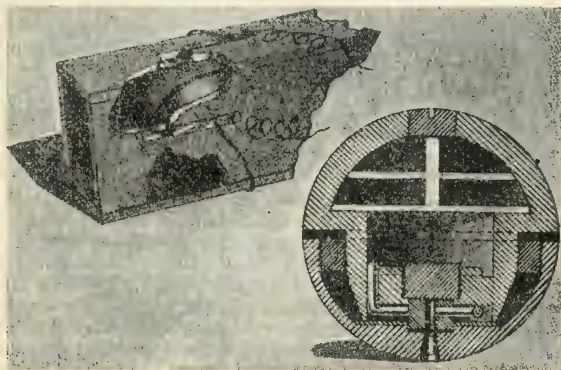
Typical of the inventions which the war has developed are those shown in the illustrations herewith. The first example is a shell for cutting barbed-wire entanglements, which is designed to travel through the air with the ease of the ordinary shrapnel or high-explosive shell until it reaches the target. Most wire-cutting shells have never proved practical for the reason that their wire-cutting members are actuated when the shell leaves the cannon, with the result that the added wind resistance of these members greatly limits the range and interferes materially with the accuracy of the projectile. In the present case the two hook-shaped wire-

cutting members are hinged as shown, and normally fit into slots in the shell case, where they are held by a soft metal band. The time fuse in the nose of the shell is set for any given distance, and serves to detonate a small charge just back of it. The explosive charge, in turn, pushes down a cone-shaped plunger which spreads out the wire-cutting arms. The cutting members are held in place by other members as indicated.

In order to make shrapnel more effective, especially when used against hostile aircraft, Edward Dartford Holmes of Huddersfield, England, has



THESE MILITARY INVENTIONS, IN THE ORDER SHOWN, ARE A WIRE-CUTTING SHELL, A MULTIPLE-CHARGE SHRAPNEL SHELL, AND A HAND GRENADE WHICH IS MADE "ALIVE" BY THE REVOLVING OF ITS SAFETY ARMS.



BY PASSING THIS SPHERICAL GRENADE THROUGH A CONTACT-MAKING TUBE, IT IS MADE READY FOR USE.

invented the multiple-charge shrapnel shell shown in the second illustration. Briefly, his scheme calls for a shrapnel shell containing a number of compartments which are each exploded in turn at predetermined intervals. And in order that the gunners may follow the progress of the explosion, each chamber is filled with a charge which will emit a different colored smoke. Two types are shown, one with the time fuse in the base, arranged to explode base-charge first and nose-charge last, and the other where the fuse is in the nose and connects with the separate charges by means of a long tube filled with a priming composition.

Numerous schemes have been suggested for making hand grenades safe for everyone except the enemy. A typical case is presented in the third illustration, which shows a hand grenade equipped with the usual safety pin and, in addition, safety arms. When the grenadier is ready to use the grenade, he removes the safety pin at the top. However, in this particular hand grenade the firing pin is screwed into the member which holds the safety arms in place, and it cannot disengage itself except by the rotation of the arms. In practice it appears that when the grenade is hurled, the safety arms rotate a few times and so release the firing pin, making the missile "alive." The safety arms, of course, drop to the ground. Should the grenade be dropped accidentally, or should it strike near friendly positions, the arms do not have sufficient time to rotate and release the firing pin, hence the grenade does not detonate.

For a similar purpose but employing electricity instead, the last illustration represents the scheme of Maurice Velin of Rambervillers, France, for making hand grenades safe until hurled at the enemy. In brief, the grenade in this case is round and consists of two metallic parts insulated one from the other and electrically connected by a fusible member, embedded in black powder. The black powder charge, in turn, connects with the explosive charge by a time fuse which may be regulated to suit conditions. As the grenades are required they are passed through a square wooden tube every side of which carries a contact spring that projects into the passageway. The contacts being connected to opposite poles of a battery, it follows that no matter how the spherical grenade passes through the wooden tube the circuit between any two contacts is closed and current passes through the fuse.—*Scientific American*, 22/12.

WEAR IN BIG GUNS.—In the current number of *Arms and Explosives* Major T. G. Tulloch (late R. A.) gives an article of much interest at the present time dealing with the wear of large guns. As the author points out, the wear of such guns has a most important influence on the cost of the war, not only on account of the expense of effecting repairs but because such wear leads to inaccuracy of fire and so increases the amount of ammunition expended to attain a definite objective. On this point he says, "In short, if a few thousandths of an inch of steel at the commencement of the rifling of guns, etc., could be prevented from wearing away in so short a time as at present, the reduction in the cost of the war, so far as guns, ammunition, transport, etc., are concerned, is almost incalculable." In dealing with this matter, Major Tulloch differentiates between the damage to the bore near the breech end—damage for which he retains the usual term "corrosion"—and that near the muzzle which he prefers to call "erosion" as it is a purely mechanical effect. The causes which produce the first-named class of damage are complex, and include the effects of temperature, the form and dimensions of the powder chamber, the chemical and physical qualities of the powder used, the weight of charge and rapidity of fire, the gas escape past the projectile, and the composition and physical properties of the steel used for the inner tubes of the gun. All these matters present many points of interest and they are discussed clearly in the article with which we are dealing. Major Tulloch attaches much importance to the evolution of methods for securing the effective sealing of the gas escape immediately after the firing of the charge, and he makes some suggestions as to the lines on which such a device may be designed. As regards the physical properties of the steel used for the inner tube, Major Tulloch considers that the heat treatment should be subject to the analysis of the steel and the forging effect, and he urges the necessity of obtaining more effective forging of the portion of the tube forming the bore, and suggests certain methods of securing this result. With regard to the erosion near the muzzle due to frictional wear and metallic fouling, it is pointed out that to secure good shooting it is desirable to prevent such fouling by all practicable means, such as slightly bell-mouthing the bore, and, as indicative

of the importance of this matter, he states that by electrolytic methods over 15 pounds' weight of copper have been removed from the bore of an 8-inch gun after firing just over 100 rounds. In concluding his most interesting article, Major Tulloch remarks that it was written to invite discussion and to call attention to certain matters requiring systematic investigation, and we much hope that it may have this result.—*Engineering*.

THE NEW MACHINE-GUN CARRIAGE OF OUR MARINES.—Among the latest equipment of the United States Marines is a new type of machine-gun carriage which strongly suggests the little dog-drawn carts and machine guns used by the Belgians in the early days of the war, with such telling effect. But in the present instance the carriage is drawn by two men, and in this respect it more closely resembles the machine-gun carriages of the Russian troops.



MOUNTED ON A TWO-WHEELED CARRIAGE, THIS LEWIS MACHINE-GUN UNIT OF THE U. S. MARINES IS HIGHLY MOBILE.

Rapidity of motion is obviously the leading feature of the new carriage, for it is provided with two ball-bearing and rubber-tired wheels. A shaft, provided with a double handle, permits two men to pull the carriage, which mounts a Lewis machine gun. The ammunition drums are carried in square steel boxes, just below the gun. In order that the gun may be used to the best advantage, its mounting is such as to provide the utmost freedom of movement. In lightness and mobility this device speaks for itself.—*Scientific American*, 15/12.

A NEW FRENCH GUN.—In order to combat the German machine guns the French of late have introduced a new quick-firing cannon of such construction that it can be readily carried forward by attacking infantry, says the *United Service Gazette*. Thus the skirmishers are able to put enemy machine guns out of action by well-directed shots from their 37-millimeter cannon, which they can carry along with them. The French "37" is a befitting companion to the famous "75," which has figured so prominently in the French campaigns to date. The smaller weapon has every feature of its larger brother, including quick-firing breech mechanism, accurate sights and automatic recoil. Lying out on open ground, two men can fire up to 35 high-explosive shells per minute. The shells measure about 1½ inches in

diameter, and the gun has a range well above a mile for accurate shooting. This odd little field piece can be readily taken apart and carried by six or eight men, and is available for use in advanced positions as well as in the open. It is a most workmanlike piece of armament for use under the conditions prevailing on the western front.—*Scientific American*, 29/12.

A TRANSFORMER WHICH HEATS SHELL BANDS.—In most of the British shell-making plants an ingenious type of transformer is being employed for heating the copper shell-bands. Briefly, the transformer consists of a closed core of laminated iron, one leg of which is hinged and counter-weighted so that it can be readily lifted to permit the copper band to be inserted over the primary winding. The copper band when once in position forms the secondary of the transformer, and because of the conversion of a small flow of standard lighting current into low tension but high amperage current in its single turn of winding, the copper band is heated in short order to the desired degree.—*Scientific American*, 29/12.

THE SUBMARINE DEPTH BOMB.—Its (the depth bomb's) destructiveness is based upon the fundamental fact that water is incompressible, and that the shock of detonating a mass of high explosive under water is felt immediately in all directions—the effect diminishing, of course, with the distance from the bomb. It will be remembered that in one of our earlier chapters on the submarine it was stated by Hudson Maxim that 4 cubic feet of trinitrotoluol at the moment of detonation produces 40,000 cubic feet of gas. Now, when a mine or bomb or torpedo war head is detonated the expanding gases seek the line of least resistance. In the case of a torpedoed ship this line leads into the hollow interior of the ship, the incompressible water forming an abutment in all directions; but when a mine or depth bomb is detonated the line of least resistance is upward, and the gases cut their way quickly to the surface, carrying a formidable mass of water to a great height into the air. If the explosion takes place at a considerable depth, however, the resistance to the upper escape of the gases is greater, and the shock transmitted through the water in all directions is proportionately increased. Failing to blow up the surface of the ocean, the bomb must blow up the submarine.

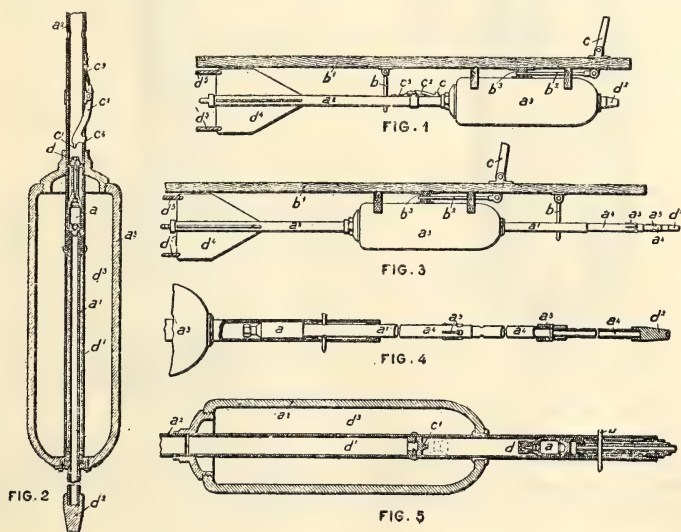
The destructiveness of the bomb against the submarine will depend upon two things: first, the depth at which it is detonated, and, secondly, the distance from the bomb to the submarine. Manifestly, then, it is advisable to detonate the bomb below the submarine, as the shock transmitted will be proportionately greater than if it were above it, other things being equal. As to the distance at which an explosion would be absolutely destructive, rupturing the plating and sinking the submarine, Mr. Hudson Maxim writes us that if 500 pounds of trinitrotoluol were exploded deep under water within 125 feet of a deeply submerged submarine it would completely destroy it. Smaller charges would, of course, have to be detonated proportionately closer to the submarine to secure destructive action.—*Marine Journal*, 17/12.

AIRCRAFT BOMBS.—The missiles which were dropped from aircraft in the early part of the great war were, for the greater part, bombs and grenades of obsolete types which had been formerly employed in field warfare. Their action was rather uncertain and their manipulation was often fraught with considerable danger.

A short time before the war broke out, the Vickers Works of England had, however, patented two types of aircraft bombs which were provided with a safety device that prevented their premature or accidental explosion. The destructive effect of these bombs also greatly exceeded that obtained with old-type missiles.

In the first type Vickers bomb the firing charge is held remote from the explosive charge until after the launching, and means are provided to cause

the bomb to explode at a previously determined distance from the ground or the target. For the latter purpose, the bomb is fitted with a "pilot," consisting of a metallic mass, which is suspended from the body of the bomb by a chain or a wire; the tension of this pilot cord is increased by a parachute, which slows down the bomb's vertical speed. The pilot cord is wound around a drum, which is connected with an aerial propeller, the latter being set in motion through the tension of the cord. When the cord is entirely unwound the spring of the percussion needle is, therefore, held in place only by the weight of the pilot, so that as soon as the latter strikes its objective the spring is released and drives the needle into the percussion cap of the firing charge, which in its turn acts on the explosive charge. The height at which the bomb is made to explode over a target is, consequently, determined by the length of the pilot cord, and can thus be adjusted at will.



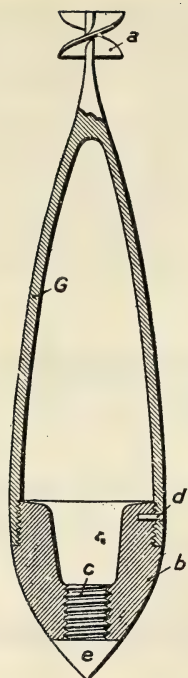
VICKERS PILOT BOMBS.

FIG. 1.—The Bomb Suspended from the Airplane Body. FIG. 2.—Longitudinal Cross Section of the Body of the Bomb. FIG. 3.—Side Elevation of a Collapsible Model of Pilot Bomb. FIG. 4.—Longitudinal Cross Section of a Collapsible Pilot. FIG. 5.—Longitudinal Cross Section of the Body of the Bomb, with Collapsible Elements Compressed.

FIGS. 1, 2.—*a*, Firing Charge; *a*₁, Pilot; *a*₂, Tail Piece; *a*₃, Shell of the Bomb; *b*, Locking Spindle; *b*₁, Airplane Body; *b*₂, Sliding Rod; *b*₃, Eye; *c*, Release Lever; *c*₁, Firing Pin; *c*₂, Spring Loaded Hammer; *c*₃, Spring; *c*₄, Stop; *d*₁, Tubular Firing-Pin Guide; *d*₂, Point of Pilot Rod; *d*₃, Percussion Cap; *d*₄, Explosive Charge; *d*₅, Stabilizing Fins; *d*₆, Parachute Cords.

FIGS. 3, 4, 5.—*a*₁, Pilot Rod; *a*₂, Longitudinal Cross Section of Collapsible Rod; *a*₃, Spring Loaded Claws; *b*, Spindle; *c*₁, Firing Pin; *a*₄, Shell of the Bomb; *a*, Firing Charge; *d*₂, Forward End of Tube *a*₁; *d*₃ Explosive Charge.

In another type the mass of the pilot is composed of a cartridge with its percussion fuse and cap, and a fuse takes the place of the cord. On striking the target the cartridge sets fire to the fuse, and this, in its turn, sets fire



THE KUNKLER BOMB.

a, Revolving Vane; *b*, Head Piece; *c*, Threaded Detonator Socket; *d*, Set Screw; *e*, Body of the Detonator; *g*, Body of the Bomb.



PILOT BOMB WITH PARACHUTE.

A, Body of the Bomb; *B*, Parachute; *C*, Pilot Cord or Rod; *D*, Position of the Spring Which Is Tensioned by the Pilot; *P*, Pilot.

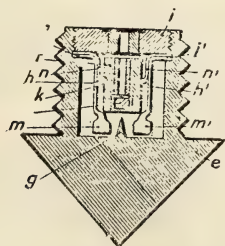


FIG. 1.

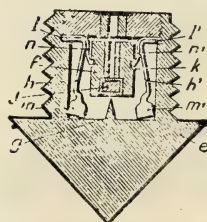


FIG. 2.

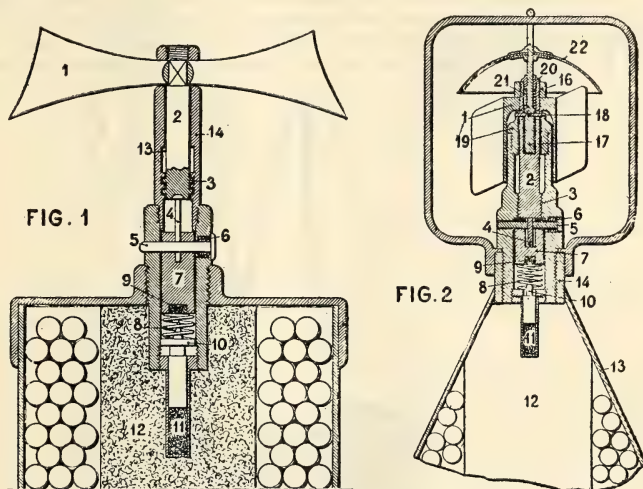
THE KUNKLER DETONATOR.

FIG. 1.—Before the Release. FIG. 2.—After the Release.

e, Head; *f*, Cap Holder; *g*, Firing Pin; *hh*, Springs; *i*, Plug; *j*, Percussion Cap; *k*, Groove; *mm*, Outer Springs; *nn*, Inner Springs, Clamping Cap Holder after the Outer Springs are Unlocked.

to the detonating charge. The latter object can also be attained by passing an electric current through the pilot, the current being furnished by accumulators housed in the bomb. The pilot cord is formed of two conducting wires, the mass of the pilot closing the current on contact with the ground. The charge is set on fire either by a spark or by an electro-magnet actuating the percussion needle.

In another type of bomb, also manufactured by Vickers, the pilot consists of a rod, which is carried through the body of the bomb in the longitudinal axis; a tail piece carries in the rear the firing charge and stabilizing fins.



TWO MODELS OF THE MACHENBACH BOMB.

FIG. 1.—1, Revolving Vane; 2-3, Threaded Shaft; 4, Extension Rod; 5, Safety Gudgeon; 6, Spiral Spring; 7, Percussion Hammer; 8, Percussion Spring; 9, Percussion Cap; 10, Percussion Needle; 11, Firing Charge; 12, Explosive Charge; 13-14, Sleeve.

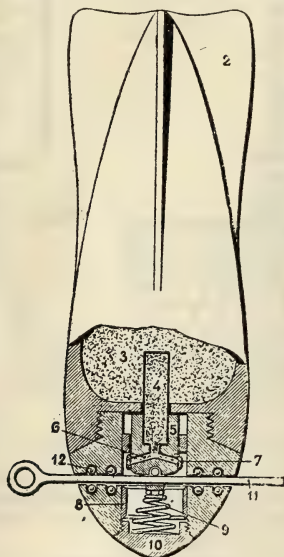
FIG. 2.—13-14, Sleeve; 7, Percussion Hammer; 8, Safety Spring; 9, Percussion Cap; 10, Percussion Pin; 11, Firing Charge; 1, Revolving Vane; 2, Revolving Shaft; 4, Pin; 5, Safety Gudgeon; 6, Spring; 16, Lock Nut; 17, Mobile Shaft; 19, Guide Screw; 20, Screw; 21, Spring; 22, Cap.

The rod rests on a suitable guide, which is locked when the bomb is inactive, but through which it is permitted to slide when the lock is removed. The firing charge is thus kept far apart from the explosive charge, so that even an accidental discharge of the firing charge is not likely to endanger the lives of the crew.

The bomb is suspended underneath the airplane in a horizontal position. By operating the lever which releases the bomb the safety lock is automatically removed and, as the bomb gradually assumes a vertical position, the pilot rod slides forward, and carries the firing charge into the center of the explosive charge. A spring-loaded percussion needle then slides into a suitable aperture provided for in the tail piece of the bomb and is ready for action. When the pilot rod hits the ground the impact makes it slide back in its guide; the firing charge is thus brought in contact with the needle and the explosion follows. To insure the free fall of the pilot rod when the bomb is released, the progress of the bomb is retarded by a parachute, while its course is steadied by stabilizing fins provided on the

tail piece. In some models the pilot rod is composed of a number of telescoping tubes, which develop their whole length under the gravitational speed. The telescoping elements are held in place, after they have reached their full development, by suitable block-devices.

In the Kunkler bomb the safety device is based on the action of the centrifugal forces developed during the fall of the bomb. For this purpose the bomb is provided, at the rear, with an aerial propeller which imparts to the bomb a rotary motion. The firing charge is lodged in the head of the bomb in a detonator, where it is held apart from the needle by means of two spring-loaded masses. As soon as the centrifugal force acquires a certain magnitude the masses will overcome the force of the springs and move toward the periphery of the bomb, thus freeing the firing charge which is then held in place only by two clamps. On striking the ground



THE PUTSCHER BOMB.

1, Body of the Bomb; 2, Stabilizing Fin; 3, Explosive Charge; 4, Firing Charge; 5, Percussion Hammer; 6, Fuse Channels; 7, Firing Caps; 8, Friction Head; 9, Spring; 10, Plug; 11, Safety Spindle; 12, Ball Bearings.

the clamps will give way and drive the firing charge into the percussion needle.

The bomb patented by Richard Machenbach and the Carbonit Sprengstoff A. G. of Germany is a missile fitted with rotating fins, which answer the double purpose of stabilizing its path and of unlocking the firing mechanism only after the bomb has travelled a certain distance, thus insuring the safety of its manipulants. Although this is no novel principle, the patentees claim for their bomb a greater simplicity and a more efficient control than hitherto attained. The firing mechanism is provided with a further safety device in so far as the aerial propeller which unlocks the firing pin is allowed to rotate only after a given time has elapsed from the moment the bomb is released. The working of this bomb, two types of which are shown, is obvious from the accompanying diagrams.

In the Putscher bomb the firing mechanism is actuated, like in the foregoing types, by direct impact. The fuse is set on fire by means of friction

firing caps and the spring of the firing pin is blocked by a safety spindle, which must be removed before the release of the bomb.

The Bergery-Dercole bomb, which has been described in *Schuss und Waffe*, is of the rebounding type. This bomb consists of an external casing which is closed on its lower end and houses the body of the bomb proper. On striking the ground the case, which carries the firing charge, acts like

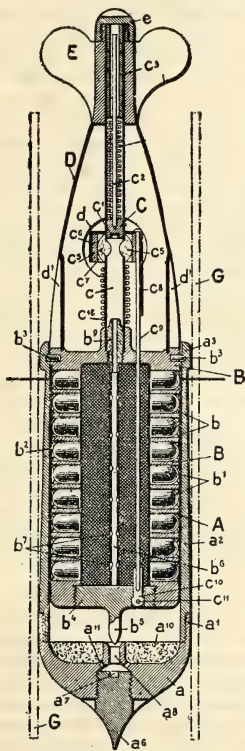


FIG. 1.

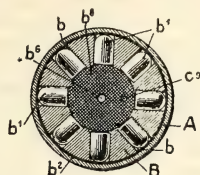


FIG. 2.

THE BERGERY-DERCOLE REBOUNDING BOMB.

FIG. 1.—Longitudinal Cross Section. FIG. 2.—Transverse Cross Section.

A, Casing; *a*, Head Piece; *a*₂, Tapered Part of Casing; *a*₃, Collar; *a*₁₀, Firing Charge; *B*, Hollow Cylinder; *b*, Projectile Ports; *b*₁, Projectiles; *b*₃, Projectile Retaining Sleeve; *b*₃, Catches; *b*₄, Plug; *b*₅, Firing Pin; *b*₆, Tube; *b*₇, Ports; *C*, Detonator; *c*, Detonator Guide; *c*₁, Firing Cap; *c*₂, Firing Pin Sliding in Tube *c*₃; *c*₄, Spring; *c*₁₀, Head of Rod; *D*, Shell Provided with Ports *d*; *E*, Stabilizing Fins Held in Position by Nut *e*; *G*, Launching Tube.

a mortar and imparts to the bomb proper a force opposite to that of its trajectory, causing it to rebound upon striking the target. The external and internal portions of the bomb are kept in their relative position, up to the moment the impact occurs, by suitable catches. When the outer case strikes the ground its motion is annulled, but the bomb proper, having a considerable inertia, will tend to continue on its path. The force thus generated unlocks the catches and drives the bomb with its firing pin against the detonating charge contained in the outer case, which then shoots out the bomb proper like a projectile is fired from a gun.—*Aviation*, 1/1.

OUR GREAT NEED FOR TOLUOL AND A NEW WAY TO MAKE IT.—The United States Government's needs for toluol for war purposes are just divulged as tremendous. A reliable estimate puts the figure at 22,000,000 gallons for the next 12 months. It is all to be converted into trinitrotoluol for high-explosive shells. Where this very large quantity is to come from has been

a source of considerable anxiety and is so still. Up to this time practically all of that needed has come from the by-product coke plants of the country. It appears as one of the by-products in coke-making and is recovered along with benzol in the benzol recovery plants. The present available output of the country from such plants for the next year is estimated at 11,000,000 gallons or only 50 per cent of the quantity needed.

About two years ago, there was great interest manifested in the discovery of a process for making toluol from crude oil, and claims were made that while the production was not strictly a commercial one, still in a national emergency, this process was the great back-log and that when the need came, the material could be rapidly produced. The emergency has arrived, and the nation needs millions of gallons of toluol for itself and its Allies. In the meantime, there has been going on without any publicity a development in toluol manufacture which bids fair to be of the utmost importance to the nation in the supply of trinitrotoluol. Early in 1915 a large company in Pittsburgh, which at that time was building a large number of by-product coke plants and, in connection with these, also benzol and toluol plants, started in the laboratories at the Mellon Institute, an investigation into the recovery of toluol from carbureted water gas—the gas made in all the large cities of the country by the gas companies for domestic use.

The conditions existing in water-gas plants were very different from those in by-product coke plants, and special apparatus and special methods had to be devised for the successful recovery of toluol. These were first installed in conjunction with the gaslight company at Washington, to effect the removal of toluol from 5,000,000 cubic feet of carbureted water gas per day. This plant was placed in operation on July 14, 1916, since which date there have been secured approximately 200,000 gallons of toluol. While this plant was the first to use this process, and many improvements increasing the efficiency and economy of operation have been introduced, the plant has proved to be a commercial and technical success, equalling the results promised by the laboratory methods. Since that time, a number of duplicate installations have been built as follows: two at Newark, one at Paterson, one at Jersey City, two at Trenton, two at Rochester, one at Chicago, and one at Evanston, Ill.

Now that the government has found what an enormous amount of toluol is required and that the trinitrotoluol is the most efficient and most satisfactory explosive, the Ordnance Department of the army has taken hold of the situation. It finds that every by-product coke-oven plant in the country is producing or has arranged to produce toluol to its utmost capacity, and that the remaining needed toluol must be secured from city gas. Seventy-two plants are available for this recovery distributed over the entire country. The Pittsburgh company mentioned has arranged with the government to build "stripping" plants in a number of large cities, and many more are being designed and estimated upon. The plans for securing toluol from these sources involve the use of excess refining capacity in all the by-product coke plants of the country.—*Scientific American*, 22/12.

TRINITROTOLUOL POISONING is one of the greatest dangers to which munition workers are subject, and much interest therefore attaches at the present time to the conditions under which such poisoning occurs and the precautions that should be taken against it. A comprehensive paper on the subject, by Dr. J. W. Schereschewsky, published in *Public Health Reports* for November 16, deserves general distribution in the industry concerned. In loading shells with this substance there is constant opportunity for nearly everybody connected with such work to become the subject of chronic poisoning through either the fumes or the dust of the substance. The explosive is generally introduced into the empty shells in one of two ways: the powdered substance is pressed into the shells by power presses, or molten trinitrotoluol is poured into them. The latter method is the more common and the more dangerous to the health of the workers. The

poison is readily absorbed through the skin or it may enter the system by way of the respiratory tract. Young people are especially susceptible to its effects; no worker under 21 years of age should be employed in processes bringing him into contact with it. A complete suit of overalls, fitting closely at the neck, wrists and ankles, gloves and a cap covering the hair, should be worn by all workers. Men should keep their hair short and be clean shaven. Overalls should be laundered weekly. The eating of lunches and keeping of food in workrooms should be strictly prohibited. Lastly, there should be rigid supervision of all workers by a competent physician, familiar with the symptoms of poisoning and the precautions for preventing it.—*Scientific American*, 22/12.

STEAMSHIP MOUNTS POWERFUL MORTAR TO COMBAT U-BOATS.—A new type of mortar from which powerful bombs may be discharged at submerged U-boats was mounted upon the forward deck of a British steamship which arrived yesterday at an Atlantic port. It was an additional means of defence aboard the vessel and the passengers praised it highly. They had witnessed tests during the voyage from England.

The mortar is similar to those used in the trenches, but is much larger. Its muzzle points high in the air and the bomb ascends more than a thousand feet, then falls rapidly upon the spot where it is believed a U-boat is lurking. In the tests the crew experienced no difficulty in hitting any point selected, it was said by persons on board. The explosion which followed threw a mass of water high into the air.

The steamship also had mounted upon her decks her usual number of large-caliber rifles.—*N. Y. Herald*, 23/12.

GERMAN ARMOR RIDDLED.—The German soldier's armor will not withstand the hard-hitting American bullet, it has been shown. A heavy breast-plate removed from a German prisoner for a test was literally chewed to pieces by machine-gun fire after a rifle bullet fired at a good range had torn a hole in the armor as big as a silver dollar.

Even the bullets from an automatic pistol did the work it was expected they would in this respect.—*Baltimore Sun*, 20/12.

ENGINEERING

REDUCING SPEED MAGNETICALLY.—A very ingenious gear has recently been invented for use in turbine-driven ships to permit a high-speed turbine to drive the propeller shaft at its most efficient speed. This gear is magnetic, and it operates on an entirely new principle. It can be designed for a great range of reduction ratios, the apparent limits being about 6 to 1 and 40 to 1, and the higher limit can be obtained in a single step.

The principle of the gear can best be understood by referring to the diagram, Fig. 1, which represents a typical design. Here we have the driven or primary field element *A*, which is rotated by suitable clutch connection with the turbine shaft. This field element, which consists of two poles, is energized by some suitable source of current. Surrounding it are two stationary cages or stators, *B* and *C*, the stator *B* consisting of magnetic bars of laminated sheet iron mounted on non-magnetic supporting rods, while the stator *C* is built up of toothed sheets of iron. The rods and teeth are magnetically energized as they come within the field of the primary element, so that as the latter rotates it sets up a wave of magnetism that sweeps around the stators. Between the stators is the driven member *D*, also made up of bars of laminated iron. It will be observed that there are 64 magnetic bars or teeth on each stator, while the secondary or driven member has 66; so that at only two points are the teeth of the stators and the secondary in alinement. With the parts at rest and under no load this alinement will be formed in the field of greatest magnetic flux—in other words, directly in line with the poles of the driving member, as shown at *E* in the diagram.

Now, let us suppose that the driven member is held stationary while the driving member is rotated to the position F , as shown in broken lines. As at this point the teeth of the stator and the secondary will be out of alignment, the magnetic force will set up a torque between the teeth which will only be satisfied when the secondary is permitted to rotate far enough to bring its teeth into coincidence with the teeth of the stator and at the point of greatest magnetic flux. In other words, while the driver is moving through the angle $A O F$ the driven member moves through an angle $G O F$. In a complete rotation of the driver there will be a movement of the secondary through the space of two teeth; in other words, there will be a speed reduction of 33 to 1. Of course, the driven member will lag behind the driver by an amount depending upon the load it has to carry.

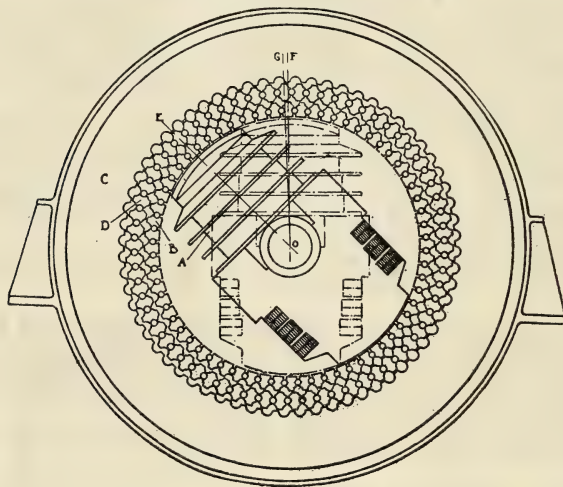


FIG. 1.—Diagram Illustrating the Operation of the Magnetic Reduction Gear.

From a brief study of this diagram it will be noted that the reduction ratio is equal to the number of secondary bars divided by the number of poles in the primary, while the number of stator teeth in each cage must be smaller than the number of secondary teeth by the number of poles of the primary. On a moment's consideration, it will be evident that if the number of teeth in the secondary is greater than that in the stator, the secondary will rotate against instead of with the driver. The torque on the secondary is not exerted by the primary, as in a magnetic slipping clutch, but is obtained by the pull of stator teeth on the secondary bars, while the primary merely furnishes the magnetic force. The secondary and stationary teeth form as many alignments as there are poles, so that if the driver is provided with more than two poles the ratio between the secondary and the stator teeth must be such as to provide the same number of alignments. Then, when the field poles are magnetized, the stator teeth will assume a position of greatest magnetic reluctance—that is, they will move into alignment with the stator teeth where the magnetic flux is greatest. Thereafter, the field cannot move without a corresponding movement of the secondary at an angular velocity determined by the reduction ratio.

This new magnetic gear is characteristic of a mechanical gear in that it has a fixed ratio of reduction for which it has been designed, and in this respect it is like a synchronous motor which when supplied with an alter-

nating current of fixed frequency will rotate at a corresponding speed; in the gear it is the speed of the driver, in place of the frequency, which determines the speed of the secondary driven element. It resembles the synchronous motor also in its ability to carry a certain maximum load before falling out of step with the driver. In designing, therefore, a suitable overload margin must be allowed above the normal operating load.

In order to corroborate the working of the principle of this gear, an experimental machine was built and to save time a stator and other parts that were on hand, were used in its construction. A photograph of this machine is reproduced herewith. It has a field with six poles. The stator consists of a single cage, which surrounds the secondary. The inner stator,

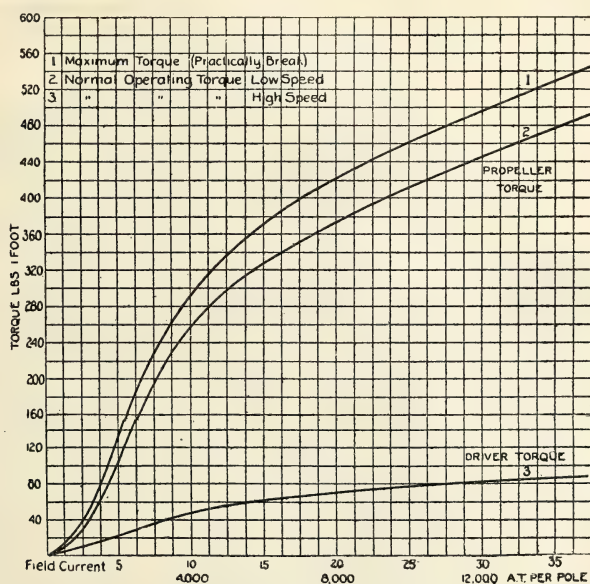


FIG. 2.—Chart Showing the Operation of the Experimental Machine.

indicated at *B* in Fig. 1, was omitted from this machine. There are 33 bars or teeth in the secondary and 27 on the stator—the reduction ratio, therefore, is 5.5 to 1. The operation of this gear is indicated in the accompanying chart, Fig. 2, in which the curve 1 represents the maximum loads the machine will carry with corresponding ampere turns per pole. It will be noted that the first part of the curve resembles the torque characteristic of a series motor while the latter part is much like a saturation curve and indicates that by increasing the pole and stator sections, the increased force beyond the bend of the curve would be made available for increasing the flux density at the bar gap and therefore adding materially to the torque of the secondary.

Based on the tests of the experimental machine, designs have been prepared for a full-sized unit, which is shown partly in section in Fig. 3, while Fig. 1 represents the arrangement of poles and teeth in the primary, secondary and stators. In the two drawings the same reference numerals are used for corresponding parts. This gear is arranged for a normal horsepower of 1500 and an overload margin of normal field of 60 per cent, reducing the speed from 3600 R. P. M. to 109, a reduction ratio of

33 to 1. This machine contains an additional stationary cage inserted between the field and secondary, the purpose of which is to increase the torque on the secondary. A torque practically double in value is produced on the secondary without increasing the core length. However, the field ampere turns must be increased to supply the necessary force for the added gap. A substantial cut in weight and an increased efficiency are the result.

The field has been especially developed to fill the requirements of high speed, balance and simple machining. It is circular in section and can be practically finished on the lathe and boring mill.

The field copper, wound directly in circular grooves turned in the core, comprises a bare strip insulated from the core by substantial insulating plates and between turns by a strip of fish paper. The insulating plates are of such thickness as to wedge the strip in the groove under tension so

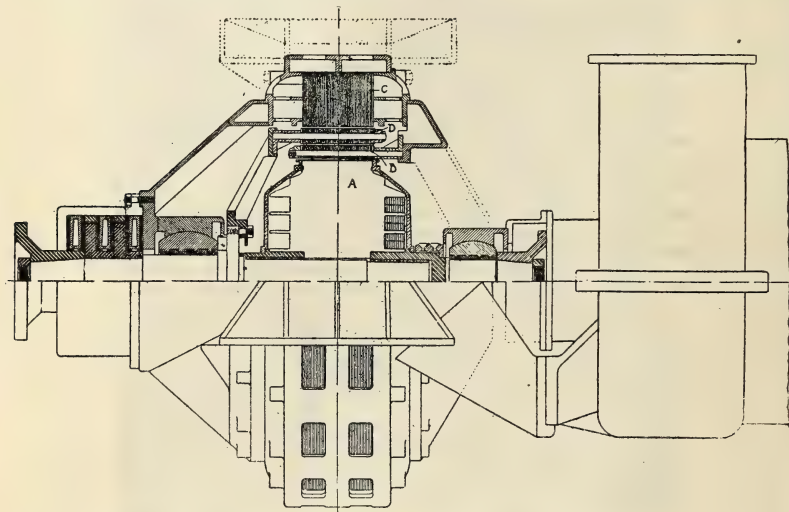


FIG. 3.—Design of a 1500 H. P. Gear Reducing from 3600 R. P. M. to 109.

that once wound and held by a bronze wire hand, the considerable centrifugal forces will be unable to displace it and thus cause unbalancing. The separating flanges serve to form a plurality of grooves to prevent a cumulative strain on the outer flange and to make possible a strip of reasonable width. Each groove contains two layers separated by an insulating plate and wound in opposite directions so as to bring all leads to the outside for easy connection.

Particular attention has been paid to the design of the cages. Their present arrangement combines the greatest possible section in the laminated bars with maximum strength of the non-magnetic supporting rods. A non-magnetic ring having axial holes drilled through, into which the rods are pressed, serves as the supporting member for the laminated bars each of which is forced between adjacent rods and insulated from them by a fiber tube on the rods 1/16-inch in thickness.

The rings, in turn, are screwed to the spider of the secondary and the stationary end bracket of the stator respectively. A narrow ring, insulated from the rods, ties each of the cages on the other side and thus makes the cages thoroughly rigid. Screwed to the spider of the secondary cage is the main or driven shaft which extends through the bore in the field so that

the field is partly supported by and rotates around the main shaft on bearings provided on either end. The two main bearings, one at the end of the main shaft and the other on a stub extension of the field sleeve, support the weight of the primary and secondary and thereby make the gear unit independent of the turbine and propeller-shaft bearings.

The main, and particularly the internal field bearings are oiled by pressure circulation, the oil being introduced into a circular groove in the center of the left-hand main bearing through a hole; from the groove into the center hole of the main shaft through several evenly spaced radial holes; out at the right end of the shaft and back through axial grooves in the bearing surfaces into a circular pocket of the spider and through holes

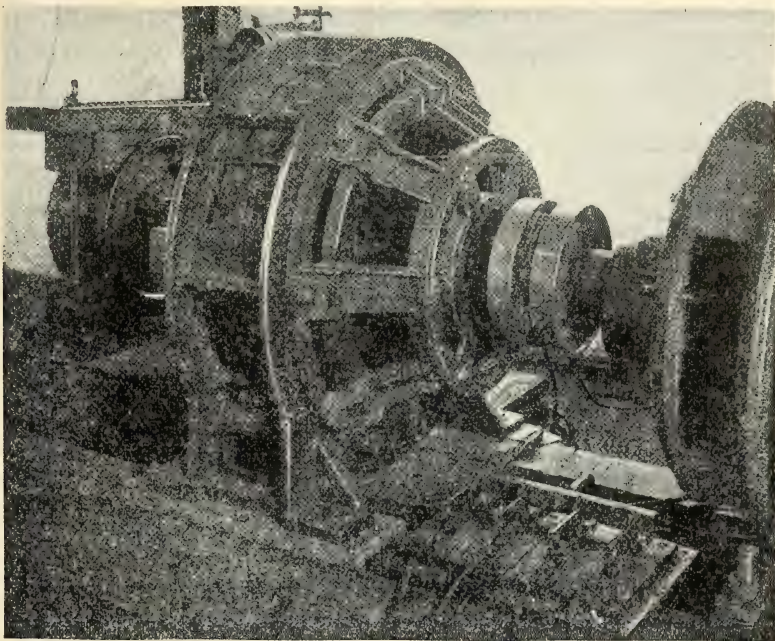


FIG. 4.—The Experimental Six-Pole Machine Which Gives a 5.5 to 1 Reduction.

back into the reservoir of the main bearing. In order to reduce the windage losses to a minimum the high velocity field member is entirely enclosed by aluminum plates on either side screwed to the field with a thin strip fastened to the plates and enclosing the outer circumference, so that externally the whole resembles a smooth drum and offers little resistance to rapid rotation.

The weight of this unit including the thrust bearing is estimated at 24,000 pounds, which, it will be noted, is less than 50 per cent the weight of a mechanical gear for a similar duty.

The losses are made up of the exciting loss, which in this design is normally 4.5 K. W. or about one-third of 1 per cent, the iron loss and the windage and friction losses and the total should not exceed 2 per cent, making the efficiency 98 per cent. The inventor and designer of this ingenious gear is A. H. Neuland of Bergenfield, N. J.—*Scientific American*.

GERMAN AEROPLANE ENGINES.—The Royal Agricultural Hall at Islington will not be the scene this year of the usual Christmas show of livestock and agricultural machinery. The hall is not, however, wholly dissevered from its normal functions, as a part of the building has been devoted by the authorities to a small, but most instructive exhibition of captured German aeroplanes and engines. The object of the exhibition is educational, and for the convenience of manufacturers and others interested in aero-engine design, several engines have been dissected, and sets of the component parts, sectioned where necessary to show the construction, have been mounted on large boards, alongside specimens of the engines to which they belong. There are altogether some dozens of captured engines either officially on view, or rendered visible, by the courtesy of the attendants, to those interested. The aeroplanes, which are five in number, occupy another part of the hall.

Perhaps the most striking fact in connection with the engines is that, with a solitary exception, they are all of the vertical 6-cylinder water-cooled type. German aero-engine design seems to have settled down along the lines of a straight-forward racing-car engine, not perhaps of extraordinary lightness for the power developed, but reliable, durable and above all, easy to manufacture in quantities with ordinary labor and shop equipment. The one exception to this type is a specimen of a 100-horsepower Oberursel engine which formerly adorned a Fokker fighting monoplane. This engine is of the 9-cylinder rotary air-cooled pattern, almost indistinguishable from the Gnome rotary engine, which is largely used by the British authorities. It has the typical Gnome pistons carrying automatic inlet-valves in their heads, and in other features the resemblance is exceedingly close.

Reverting to the standard 6-cylinder engines which really constitute the exhibition, these comprise the following types and sizes, namely, Mercedes 160-horsepower and 260-horsepower; Benz 160-horsepower and 220-horsepower; and Argus 120-horsepower and 200-horsepower. The Argus engines differ from the others in the fact that the cylinders are in pairs, one sheet-iron water-jacket enclosing two cylinders, but as these engines have not yet been sectioned it is not possible to see the details of the cylinder construction. One of them is equipped with an English carbureter and English magnetos, and we believe that many captured German engines have been found thus equipped. It is said to be the German practice to design their engines to take British accessories and so to be able to utilize valuable fittings stripped from our machines which have come to grief behind their lines.

The Argus engines are also noticeable by reason of the amount of labor spent on the elaborate finish of unimportant parts. This is certainly not a typical failing of German engines, for these as a rule display a common sense in the matter of finish, and of simplicity of detail, which our own manufacturers might emulate with advantage. On the whole, in so far as it can be inspected, the Argus engine does not appear to have any extraordinary merits, while in certain details, such as the use of loose cams secured by taper pins, the design is anything but commendable. On the whole, one probably would not be far wrong if he said that an equally good, or better, engine could be made for less money.

The real interest of the exhibition to designers of aero-engines lies in the remaining types, the Benz and Mercedes. These appear to represent the outcome of German experience as to what an aero-engine ought to be, at any rate for such work as long-distance bombing flights if not for more spectacular duties. The Gotha biplane carries two 260-horsepower Mercedes, the A. E. G. is similarly equipped, and the Rumpler biplane is fitted with a single engine of the same power and pattern. Benz engines of 220-horsepower are carried in the Aviatiks and the Agas. The Albatross two-seater carries a 160-horsepower Mercedes.

The Benz and Mercédès engines are, broadly speaking, of the same general pattern, each having six independent vertical water-cooled cylinders, with sheet-iron welded jackets, and both representing the final development of their racing-car prototypes. They weigh, we understand, about 3.75 pounds per normal brake horsepower at ground level, this figure comprising a complete engine, but without radiator, fuel, oil, or tanks. Of the two the Benz is slightly the lighter per brake horsepower, and from the manufacturing point of view the details of its design are generally preferable to those of the Mercédès. The 160-horsepower Mercédès aero-engine of pre-war days had cylinders in pairs, like those of the Argus, and the crankshaft was also of peculiar design, but these features have been abandoned in the modern engines.

Dealing with the points of difference, the Benz cylinders are of cast-iron with solid valve-seatings arranged vertically in the head, whereas the cylinders of the Mercédès are of steel with exhaust and induction ports screwed in at an angle. In both sizes of the Benz engine the inlet and exhaust valves are duplicated, and are operated by a crankshaft housed in the crankcase. In the Mercédès engine a central overhead camshaft is adopted and duplicate valves are only used in the larger size. The casing of this camshaft appears a very costly piece of work, and the Benz design seems unquestionably better. The Benz pistons are of cast-iron with three rings at the top and no scraper ring. A perforated steel cone is riveted to the inside of the piston-head, the apex of the cone forming a small seating on the center of the gudgeon-pin. The function of this cone is probably to assist the lubrication of the pin, although the support it affords to the latter may be useful. The piston of the Mercédès is formed by screwing a steel head, carrying the gudgeon-pin bosses, into a cast-iron skirt. The design of the connecting-rods also shows considerable difference. The Benz rods are of parallel tubular form, involving only lathework of a simple kind, whereas the Mercédès rods are of the usual I-sections which gives greater trouble in machining.

Coming to the crankcase, in both engines the lower half of the case forms a support for the crankshaft so that the bearings and connecting rod-ends are very inaccessible when the engines are erected. This would appear to be an objectionable feature of both designs, unless it has been found that sufficient rigidity is not obtainable otherwise. There are no ball-bearings for the crankshaft of either engine, except for the thrust bearings. Oil cooling is arranged for on the Benz engine by a number of horizontal tubes passing transversely through the pump. A cowl on one side of the casing directs air into the tubes, and a similar cowl on the other side, facing backwards, assists the draft through them. In the same engine the crankshaft bearers are also cored transversely from side to side, so that the air-circulation may tend to cool the bearings, and through two of these ports the air is drawn to the carbureters. The induction-pipe system of the Benz compares favorably with that of its rival and the water circulation system seems pronouncedly superior. On the other hand the circulating pump of the Mercédès, with its shrouded impeller and volute discharge is of much superior design to that of the Benz.

The general impression left on the mind by an inspection of the captured engines, is that the Germans have carried the standardization of type infinitely further than we have, and therefore have placed themselves in a position to manufacture aero-engines with the maximum rapidity and cheapness. We have certainly captured many hundreds of German engines, and it is only reasonable to suppose that the collection at the Agricultural Hall is fairly representative of the bulk of those now used against our troops in Flanders and our civilian population at home. It is therefore a matter for remark that, except for the solitary Gnome engine, the Germans appear to have abandoned, or never to have used, the rotary type, the radial fixed type, the Vee type, the opposed type or the Broad Arrow

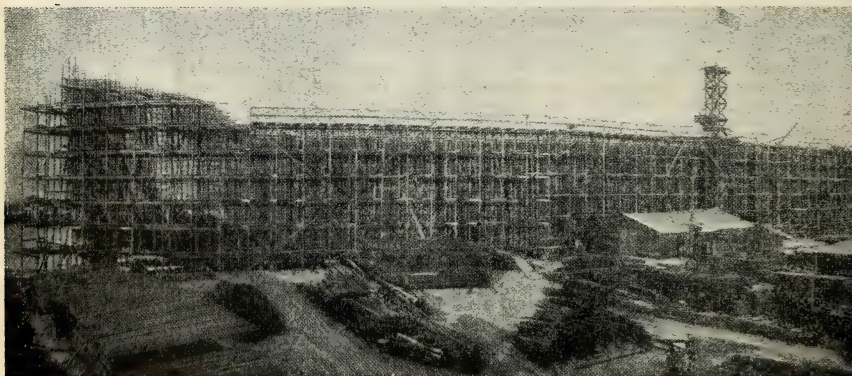
type, not to speak of the numerous variants which each of these types comprises. They pin their faith, apparently, to a simple engine with the minimum number of parts, and devote their energies to increase of numbers rather than to the development of types. That "it is lawful to learn from the enemy" is a maxim as old as the art of war, and though our designers might gather some useful lessons from the engines exhibited, and notably from the Benz engine, we think that the most important lesson of all is to be learnt by reflecting upon the contrast between the present exhibition, and one which would be equally representative of current British practice.—*Engineering*, London, 14/12.

NAVY SHIP REPAIRS.—During the past year a greater volume of work has been performed under the Navy Department bureaus of steam engineering and construction and repair than ever before. Every navy yard is working to the extent of its capacity and employing the force overtime. In addition to that a large part of the repair work has been assigned to private plants under contract.

It has been found that the merchant ships, and especially the interned enemy vessels, taken over by the Navy Department, have required, almost without exception, a great deal of repair work, showing that in most cases the vessels were badly run down.

The destroyers and other craft that have been sent to foreign waters have given an admirable account of themselves in the freedom from disability. Much repair work of a minor nature is done by the ships' forces, and more extensive repair work now is possible abroad by the presence on the European station of the repair ships *Dixie* and *Melville*, the operations of which are in charge of Commander Albert T. Church, who, while on duty at the Navy Department in the bureau of steam engineering, had a great deal to do with the equipment of those vessels.—*Washington Post*, 10/1.

FIVE-THOUSAND-TON REINFORCED CONCRETE SHIP BUILDING IN CALIFORNIA.—One of the most daring experiments in concrete ship-building is the project now under way at Redwood City, Cal., where the San Francisco

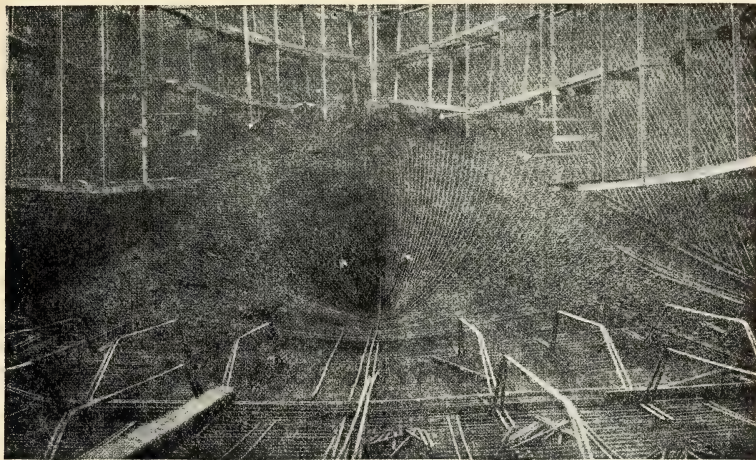


FIVE-THOUSAND-TON REINFORCED CONCRETE VESSEL UNDER CONSTRUCTION AT REDWOOD CITY, CAL.

Ship-Building Company is building a reinforced concrete freight steamship of 5000 tons' deadweight carrying capacity on a draft of 24 feet. The vessel is 320 feet long, 45 feet beam and 31 feet depth molded. She will be fitted with Scotch boilers and a triple expansion reciprocating engine of

1750 horsepower designed to give the vessel a speed of 10 knots at sea. Tank storage space for fuel oil will be provided sufficient for 30 days' steaming at her designed speed.

Some idea of the size and details of construction of the vessel can be gained from the photographs reproduced herewith, which show the progress of construction about December 1. The officers of the San Francisco Ship-Building Company, which is building the vessel, are: President,



INTERIOR VIEW AT BOW.

W. Leslie Comyn; vice-president, John Lawson, of Balfour, Guthrie and Co.; secretary, Kenneth MacDonald, of MacDonald and Kahn, and treasurer, George U. Hind. Messrs. Leslie Comyn and John Lawson, acting as an executive committee, exercise active management of the affairs of the company.—*Marine Engineering*, January.

AERONAUTICS

THE NAVAL ACADEMY AIRCRAFT FACTORY in a Pennsylvania city is, according to *The Army and Navy Journal*, completed and in operation. This plant, which covers three acres, the main building being 400 by 400 feet, was begun in August last. The structure was completed in November, the machinery installed, and the keel of the first flying boat laid within 90 days after construction started. The plant and its equipment cost the work necessary in the manufacture of seaplanes. Machinists are needed to operate the plant to its full capacity.

Almost every type of craftsman can help in some of the many kinds of work necessary in the manufacture of seaplanes. Machinists are needed to make and assemble the parts. Sheet-metal workers, acetylene welders, braziers, bicycle tube benders, coppersmiths, and wireworkers are all needed, and there is a demand for cabinet-makers, pattern-makers, boat builders and joiners. Women are needed to sew covers on the wings of the planes, and also to do some of the lighter woodwork.

The League Island Navy Yard, Philadelphia, is the place to apply for employment in the new naval aircraft factory.—*N. Y. Times*, 13/1.

HURRYING PLANS FOR ESTABLISHMENT BETWEEN FRANCE AND ENGLAND.—Plans for the establishment of an aerial postal service between France and England are rapidly approaching realization, and it is now believed that such a service, on a limited scale, will be put into effect without waiting for the end of the war. It will be used only for carrying official correspondence, especially that of the inter-allied committee sitting at Versailles. Reports and communications from the American representatives thus will catch the mail boats from England in about two days' better time than by the old methods.—*Evening Star*, 9/1.

U. S. NO AIR POWER IN SPRING.—Germany will have nothing to fear from the United States air-fighting forces during the coming spring, because the American aircraft program is "far behind" its schedule, according to Major William A. Bishop, winner of a Victoria cross, who addressed the Canadian Club at Montreal on Friday.

Major Bishop characterized as "unfortunate" the advertising which has been given the United States Government's aircraft program. He said that while France would find it impossible further to enlarge her airplane fighting forces during the coming half-year, Germany, knowing America's intentions, has greatly expanded her flying corps in an effort to gain supremacy in air warfare. Consequently, he declared, during the next few months Great Britain will have "to face the most terrible time she has yet faced, and especially from the point of view of war in the air."

America's assistance in maintaining allied air-fighting superiority "may be felt" by summer, but during the spring months Major Bishop said "the United States will not be a factor for the Germans to reckon with in the air."—*Washington Post*, 13/1.

REPORT OF THE U. S. NAVAL OBSERVATORY.—In his annual report to the Bureau of Navigation, Rear Admiral Howard, U. S. N., retired, superintendent of the Naval Observatory, refers to aviation instruments as follows:

"In conjunction with the station at Pensacola and other commands engaged in flying, the observatory has practically accepted as standard an altimeter (altitude aneroid barometer) and a clock. A compass for aircraft has been adopted and issued but is not proving entirely satisfactory, and further experiments are under way.

"One form of statoscope for dirigibles has been found satisfactory for certain purposes and will be issued to each dirigible when delivered. This is the Custer type. This instrument is non-luminous and does not indicate speed or amount of change of height. The observatory is assisting various inventors and makers of instruments to devise a statoscope that will answer all requirements.

"The observatory has on hand a small number of airplane cameras of acceptable design. These are not fixed in the car and their value will have to be determined in service. Other forms of cameras are under trial.—*Aviation*, January.

WHEREIN GERMAN CONSTRUCTORS SHOW GREAT SAGACITY.—Time and again it has been admitted in this column that the Teuton is a formidable aerial enemy. And somehow or another he has always been able to keep up with the combined production of Great Britain, France, Italy and Russia, not forgetting such aid as the Allies have received from the American constructors prior to our entering the world war. Just why this Teuton efficiency should remain manifest in the face of what appears to be an overwhelming handicap, is now beginning to be understood. The cardinal fact is that the Teuton, from the beginning, has considered the aeroplane in the light of a big motor fitted with a pair of wings. When the Allies built machines with 80-horsepower rotary engines at the beginning of the war, they found themselves competing with German planes fitted with

120-horsepower Mercédès engines. Needless to say, the allied machines were hopelessly outclassed; and on the side of the Germans the lack of numbers was made up by the superiority of the unit. Then the Allies went to the 100- and 120-horsepower plane, only to find that the Teuton had already gone to 160, 200 and 220 horsepower. Always have the allied planes been underpowered; and in order to increase climbing and speed characteristics the British and French constructors have had to shave off every ounce of cloth and wood possible to a point where the factor of safety is little more than a name. On the other hand, the Germans, working with a solidly-built machine, meet climbing and speed requirements merely by piling on more horsepower. We Americans have done well in developing the Liberty motor first, before our aeroplanes; for after all the Teuton is quite right: an aeroplane is nothing more than a powerful, reliable motor—with a pair of wings—*Scientific American*, 24/11.

MATERIALS NECESSARY FOR SINGLE AIRPLANE EXCLUSIVE OF ENGINE.—The following figures have been received from the Signal Corps, Aviation Section, of the materials necessary for a single airplane of the more simple type, and exclusive of all the materials necessary for the engine:

Nails	4326
Screws	3377
Steel stampings	921
Forgings	798
Turnbuckles	276
Veneer	square feet 57
Wire	feet 3262
Varnish	gallons 11
Dope	gallons 59
Aluminum	pounds 65
Rubber	feet 34
Linen	square yards 201
Spruce	feet 244
Pine	feet 58
Ash	feet 31
Hickory	feet 1½

—*Official Bulletin*, 29/12.

THE LANZIUS SPEED SCOUT.—The Lanzius speed scout is, unlike most present-day airplanes, a machine in which the incidence of the wings may be altered in flight at the will of the pilot.

Such an idea is not wholly new. Aeronautical investigators have predicted for years such a possibility. Indeed, Captain Duchène in his celebrated work, "The Mechanics of the Airplane," dwelt with considerable force on this subject, and prophesied the adoption of the principle of variable incidence in future machines, to reduce or augment the drag which would give the pilot opportunity to check or increase his speed. He pointed out that existing difficulties "may be eventually overcome by the invention of the variable surface machine, which would permit a high speed to be maintained in normal flight while starting and landing could be accomplished at slow speed."

A machine based on this principle was produced in 1912 by Paul Schmitt, a Russian engineer living in France, and fully proved the correctness of the theory of variable incidence. This machine broke at the time several world's records for flights with five and more passengers. (A description of the Paul Schmitt airplane appeared in the October 1, 1917, issue of *Aviation and Aeronautical Engineering*.)

George Lanzius, a Hollander, who was working on this very theory at that time and built models of the same as early as 1911, continually improved his design until during the early part of 1917 he constructed a

machine incorporating these features, which was successfully demonstrated in flight.

The outstanding features of this machine are:

1. A cantilever frame, rigidly constructed to support the planes.
2. Planes pivoted in frame capable of being operated by pilot from 0 to 15 degrees.
3. Ailerons pivoted on plane tips under the angle of about 15 degrees, movable in opposite directions transverse to the planes.
4. A distinctive system of lateral control.

The machine is entirely built of steel, except for the wing frames. No wiring is used in the construction of the body, all members being joined by riveting. The cantilever frame is built up of stream-lined tubing and the wings are pivoted on this frame at the will of the pilot by means of a fixed worm-gear.

The wings are built up in the usual way of wooden frames and are covered with fabric. The drift wires do not run to the radiator frame but are fastened to the upper longerons of the body. The skeleton of the machine weighs complete 380 pounds.

The under carriage is built up of stream-lined V-struts and is equipped with resilient Ackerman wheels, which obviate the necessity for special shock absorbers. The control is of the stick type.

The characteristics of the Lanzius Speed Scout, as furnished by the manufacturer, are the following:

Span, upper plane	29 ft.
Span, lower plane	24 ft.
Chord, upper plane	4 ft.
Chord, lower plane	3 ft. 6 in.
Overall length	24 ft.
Overall height	8 ft. 6 in.
Weight, empty	1200 lb.
Weight, loaded	1800 lb.
Engine, Sturtevant	210 h. p.
High speed	140 m. p. h.
Low speed	40 m. p. h.
Fuel capacity	4 hrs.

—*Aviation*, January.

UNITED STATES AIRCRAFT PRODUCTION.—Howard E. Coffin, chairman of the Aircraft Production Board, has issued the following statement:

July 24, 1917, the date of the President's approval of the aircraft act, providing for the creation of the United States Military Air Service and providing \$640,000,000 for its maintenance, marks the real beginning of aircraft history in this country.

About half of this amount appropriated was provided for the purchase of aircraft, of aircraft armament and equipment, and the remainder for the building up and maintenance of an air-service personnel greater than that of our entire standing army of a few months before.

At about this same time also our close contact with the allied air services was established through a strong military, technical, and industrial mission of more than 100 men sent to Europe. As a result of conference the policy of aircraft development mapped out for this country at that time was sevenfold.

This policy remains practically unchanged, and is as follows:

1. The United States to establish and maintain a great system of training stations, adequate both in ground schools and flying schools, to provide preliminary training for the personnel schedule.

Twenty-four great training stations were authorized under the bill to be built in accordance with the requirements scheduled in the air-service program. Nine grounds for the preliminary training of the flying personnel

in technical matters were planned at nationally known universities. Both lines of work have been completed in accordance with schedule almost to a day. More than half of these training stations are already in full operation, and the others under construction in strict accordance with the general plan.

2. To accomplish an international standardization in aircraft materials, in detail of design and types, and to achieve such coordination of effort as would concentrate the manufacturing facilities of the various allied countries upon the minimum number of types of those machines for which the producing equipment was best fitted.

International specifications for aircraft materials have been prepared under the direction of the board by a committee representing the allied countries. A complete coordination of manufacturing facilities and policies has been agreed upon between the allied powers. Standardization in types, designs, and materials will continue to be carried forward under international agreement already in effect.

3. To construct primary training machines of quality and quantity approved by the Joint Army and Navy Technical Committee.

The production of standardized training machines approved by the Joint Army and Navy Committee will be in excess of the needs of the program by January 20. The production of these machines has been behind schedule because of the necessity for supplying training engines from this country to meet Canada's considerable requirements and because of the difficulties of a sudden increase of a manufacturing industry inadequate to the task.

4. To provide, equip, and train personnel for flyers and mechanics in accordance with schedule recommended by the Joint Army and Navy Technical Committee

This program is progressing exactly on schedule. The training of both flyers and mechanics is provided for in this and in allied countries. Thousands of mechanics are being put into actual service with the allied forces. Trained men will be released as needed in the United States Air Service and their places kept filled with fresh material. Four of the northern flying schools near manufacturing centers have, in accordance with the training plans, been turned into mechanics' schools during the winter months. American flyers are in training in the United States and abroad and it is probable that the original program for pilots will be increased. The personnel for such increase is already available.

5. To provide raw and semi-finished materials and finished parts, including motors, to insure the consummation of the augmented allied aircraft-building programs.

This has been and is being done. All of the allied nations are in considerable degree dependent upon materials and parts shipped from the United States. It is vitally important that the American aircraft program be not permitted to interrupt this flow of materials to the Allies.

6. To provide for the equipment of the American forces in France for the period of January to June, 1918, in large part by purchase of fighting machines manufactured in allied countries, and to supply the machine tools and raw and semi-finished materials necessary to insure their production.

One of the first acts of the Aircraft Board after the passage of the appropriation bill in July was to authorize the placing by General Pershing of orders for several thousand fighting machines in allied countries. This action was taken to insure adequate equipment of the American forces prior to June, 1918, in case of expected delays in manufacture and shipment of American-made service planes. Many millions of dollars' worth of materials and machine tools have been shipped from this country to aid this production.

7. To provide completed service machines, including combat and bombing types, for American need after July 1, 1918, and for such shipment of the finished product overseas as tonnage might permit.

In accordance with the plans originally agreed upon with allied governments, it was deemed advisable to provide for advanced training overseas adjacent to the actual theater of military operations, but so energetic has been the work of the personnel division of the Signal Corps that the training facilities thus provided have been soon overcrowded, with resultant request that early arrangement for advanced training be made in America. To meet this change in program, delivery of advanced training planes will begin this month and within 90 days will have met requirements. The engines of foreign design for this advanced training schedule are already in quantity production in this country.

In discussing the accomplishments of the air service in the consummation of the army program, it will be well to point out the impossibility of certain proposals enthusiastically and persistently put forward by word of mouth and in the press. We have seen and heard much of the proposal of "100,000 airplanes" to be provided by the United States within the next year. In a country where one great industry produces a million and a half motor cars per year the fabrication of a hundred thousand planes might seem easy, but actual figures based upon three years of practical experience in the war show that there are now between 40 and 50 men of the auxiliary services required for each active machine at the front. If this same ratio should be adhered to in our service it would mean that some four million men would be required in our aeronautical department on foreign soil between our ports of debarkation and the fighting front.

Even though this number of men could be reduced by 50 per cent by increased efficiency and standardization, the number required is still staggering. Consider, also, the overseas transportation problem as related to material only and without reference to personnel and its maintenance. The transportation of finished planes, properly crated, with the necessary spares, accessories, and equipment is in itself a serious problem, in view of the situation in ship tonnage.

Again, the problem of proper housing behind the battle lines in Europe of such great numbers of planes as are carelessly discussed may well be left to sober thought.

Every policy in the development of the American Air Service has been decided upon recommendation of our technical advisers in daily consultation in allied countries, and under advice of an inter-allied staff of half a hundred experts assigned to our air service in the United States.

Every decision of the Aircraft Board has been based upon the military policies of the front. Daily cable communications with allied countries are maintained. The freest possible exchange of information, machine designs, and aircraft experts with foreign countries is in effect. Airplanes and engines of the very latest European development are going into production in the United States as quickly as, and perhaps more quickly and in greater quantities, than in allied countries. The feat of getting the 12-cylinder U. S. A. or so-called Liberty engine from the first scratch on paper in June to the beginning of production of quantity manufacturing tools in November is one never equalled even among the spectacular performances of the American motor-car business.

In June, from one to three weeks were required to deliver a properly authorized contract to a manufacturer after all details of the negotiation had been settled. To-day, a few hours only are needed. The slowness of the government departments in paying for the goods delivered has been a contractor's complaint of long standing. For 60 days past, in the disbursement of millions, no Signal Corps account properly presented has remained unpaid longer than one day after the delivery of the material.

Wherever facilities for manufacture have been offered which have seemed to promise reliable sources of supply in considerable quantity, investigation has been made by industrial experts to determine the value of these concerns in connection with the production program. Obviously, dependence for deliveries of the types of machines standardized by the

War Department could only be placed upon large concerns amply financed and controlled by organizations familiar with the processes of duplicate quantity production.

Since the passage of the aircraft bill in July, hundreds of concerns have asked for contracts to manufacture planes. Inasmuch as an organization of government accountants, inspectors, and production men must be maintained in each plant engaged upon the aircraft program, the complication, expense, and general impossibility of splitting up the work among a multitude of small contractors, each capable of producing but a few machines, should be clear. The government's best interests lay in safeguarding delivery in the most efficient way and at the lowest price, and required the building up of a nucleus of strong concerns to serve as the backbone of the aircraft program. Should the allied governments contemplate, as the war progresses, a further extension of American producing resources, there will be no difficulty in building up new sources of supply in every line of the work.

The policy pursued by the War and Navy departments, under direction of the board, has of necessity brought criticism from many quarters upon the part of small concerns or upon the part of those institutions unfitted because of location or of labor or other unsatisfactory conditions. Contracts have been requested upon the part of many concerns minus experience in the manufacture of such highly specialized goods and having not the slightest comprehension of the intricate ramifications involved in airplane and airplane-motor construction.

New sources of supply, flying fields, the experimental laboratory, and other activities under the direction of the board have been purposely located west of the Allegheny Mountains, in accordance with the stated policy of the military departments, to remove sources of war supply "200 miles from the seacoast," and to avoid the labor congestion which exists in all eastern industrial centers. The reasons for such a policy are too obvious to require comment.

Established plants of the motor car industry are being largely utilized in the program of aircraft-motor production, but automobile concerns are not being employed in airplane construction. In general, the statement may be made that not a single automobile factory is in any way involved in the plane-building industry. The reasons for utilizing the motor-building talent of the third largest of the world's industries permit no argument.

There has been established in Paris under the direction of the Aircraft Board a joint army and navy aircraft committee to coordinate the activities of army and navy in foreign territory and to form a direct channel of contact between the inter-allied aviation committee and the Aircraft Board in Washington.

The board has arranged with foreign governments for a free interchange of manufacturing rights and patents governing aircraft for the duration of the war. Endless business negotiations with foreign private interests have thus been avoided and delays have been eliminated and the expenditure of many millions of dollars prevented.—*Official Bulletin*, 11/1.

MERCHANT MARINE

SKINNER AND EDDY LAUNCH FIRST SHIP FOR UNITED STATES SHIPPING BOARD.—Before 15,000 spectators the steamship *Seattle*, the first ship to take the water under the United States Shipping Board's contracts, was launched at the plant of the Skinner and Eddy Ship-Building Corporation, Seattle, Wash., on Saturday, November 24, at 12.30 p. m. To commemorate the event the Shipping Board permitted this ship to be christened with the name of the city which had turned out their first product.

Under the Shipping Board contracts the *Seattle* received the official number 83, that many contracts having been awarded before the Skinner and Eddy Corporation received their six. As the *Seattle* is patterned after

the same design as the other 8800-ton cargo carriers turned out by that plant, everything was ripe for a speedy delivery of this ship, and within 77 working days after the keel was laid, Dave Rogers, the works manager, and his band of loyal workers had this ship in the water.

The sponsor for the *Seattle* was Mrs. Ernest Lister, wife of Governor Lister of Washington.

The *Seattle* is the eleventh ship turned out by the Skinner and Eddy yard in less than 20 months, number 10 being the *War Flame*, which was launched in 64 working days from the day the keel was laid, thus establishing a world's record for the construction of ships of the 8800-ton deadweight class.

At the same moment the *Seattle* was launched the Ames Ship-Building and Dry Dock Company, of Seattle, launched their first product, which is called the *War Brigade*.

Two more launchings are scheduled at the Skinner and Eddy plant before December 31, and during the next year it is expected that more than 14 ships will be sent down the ways at this plant.—*Marine Engineering*, January, 1918.

VESSEL LAUNCHED AT YARD BEGUN SEVEN MONTHS AGO.—A telegram to the Shipping Board told of the launching at Los Angeles of the first steel merchant ship contracted for by the Emergency Fleet Corporation. The vessel was one of eight of 8800 tons' capacity each ordered May 12 from S. L. Naphthaly.

Turning out the vessel within seven months, when the yard in which it was built had to be constructed after the contract was awarded, was hailed by Shipping Board officials as demonstrating what American industry can do in an emergency.

One vessel contracted for by the Emergency Fleet Corporation already has been launched, but it came from the yard at Seattle, which has been in operation for many years.—*N. Y. Herald*, 17/12.

OUR SHIPBUILDING PROGRAM.—Writing recently in *Sea Power* Walter R. Alexander, attorney of the United States Shipping Board, states in part that "the following table is a summary of the complete ship-building program of the board:

	No.	Deadweight Tonnage
Ships which were requisitioned by order of August 3, 1917.	403	2,800,000
Ships for which contracts had been let September 22, 1917, under program for new ship construction	636	3,124,700
Program contemplated under additional authorization of Act of October 6, 1917	600	5,000,000
	1,639	19,924,700

All of the vessels represented in the above program will be suitable for overseas commerce. As a basis for comparison it may be stated that at the commencement of the present world war the United States had less than 1,000,000 tons deadweight of ships registered for foreign trade, and has at the present time about 4,571,000 tons deadweight registered therefor.—*Scientific American*, 29/12.

MAY TAKE SAILING SHIPS.—Requisitioning of all American sailing vessels was forecast to-day when the Shipping Board requested the Department of Commerce to report the location of such vessels. Secretary Redfield replied that 175 sailing vessels, with a cargo-carrying capacity of 425,000 tons, now are within or adjacent to American territorial waters.

There are nearly 500 sailing vessels of 1000 tons or larger flying the American flag, and it is being urged that in this time of stress, when the liberty of the world depends on shipment of food and supplies to Europe,

the vessels should be taken from private business and put into the public service.

Of the 175 vessels which could be made immediately available, 76 are in ballast, 90 are loaded and 9 are undergoing repairs which will be finished soon. The other vessels are scattered.—*N. Y. Times*, 4/1.

NAVAL CREWS FOR MERCHANT VESSELS.—If it were some new theory advanced in favor of a special interest the question of manning merchant vessels with naval crews or with a definite proportion of naval crews might be open to further inquiry and discussion. But behind this proposition is a solid body of practice established during eight months' experience of war and demonstrating that the conditions on board chartered commercial vessels have been detrimental to the efficiency so vitally demanded.

No reflection on the skill and patriotism of merchant officers enters, nor does any proof exist that naval officers and crews embarked have in such circumstances assumed to exercise any undue authority, but clashes have been frequent between the two elements and transportation has suffered. War is war, and the organization of merchant vessels, however well suited to ordinary voyages in peace, does not lend itself either in kind or degree to the new and strange requirements of hostilities. Then, too, naval discipline varies in many essentials from that enforced in the mercantile marine, and this alone must result, and has resulted, in the friction and danger created.

Relief is promised for these anomalous conditions. The sub-committee of the House Naval Committee inquiring into the navy's conduct of the war will, it is reported, recommend legislation for manning merchant vessels with enlisted men of the navy. The scope of this intended measure has not been revealed, but it is a departure in a right direction and it is hoped that Congress will accept it, a proper recognition of the rights of merchant officers and a due regard for their susceptibilities being observed.—*N. Y. Herald*, 11/1.

FORTY-ONE SHIPS BY END OF FEBRUARY.—Forty-one ships of approximately 300,000 tonnage will be delivered to the Emergency Fleet Corporation from their ways by the end of February. This announcement was made to-night by E. N. Hurley, chairman of the United States Shipping Board.

These ships were requisitioned from private owners by the government for war purposes. Eighteen of them will be completed during January, with a total deadweight tonnage of 145,091. Twenty-three will be finished by the end of February, with total deadweight tonnage of 182,061.

These ships for the most part are cargo vessels and tankers.

Their place of delivery, builders and type follow:

Seattle—Seattle Ship-Building Company, three cargo ships; Skinner and Eddy, one tanker, one cargo; Ames, two cargo.

Portland, Ore.—Williamette, three cargo; Albina, two cargo.

Oakland, Cal.—Moore and Scott, three cargo.

Newport News—Newport News Ship-Building and Ddrydock Company, one cargo, one tanker.

Quincy, Mass.—Bethlehem—Fore River plant, two cargoes.

San Francisco—Bethlehem, one cargo, three tankers.

Columbia River or Puget Sound—Duthie, four cargoes; Columbia, one cargo.

Baltimore—Baltimore, two cargoes.

Philadelphia—Cramps, one passenger and cargo.

Port of New York—Cramps, two cargoes and passenger.

Gloucester, N. J.—Pennsylvania, two tankers.

Delaware River—Chester, one cargo, one tanker.

Port Richmond, N. Y.—Staten Island, one cargo.

Camden, N. J.—New York, one collier.

Long Beach, California—Craig, one cargo.

Wilmington, Del.—Bethlehem-Harlan plant, one cargo.

—*Baltimore American*, 14/1.

PUTS SHIP OUTPUT AT 5,000,000 TONS.—To the statement of H. L. Ferguson before the Senate Commerce Committee that only 3,000,000 tons of shipping would be constructed in American yards this year, Edward N. Hurley, chairman of the Shipping Board, replied to-day with the assertion that the total output would be approximately 5,000,000 tons. In support of this a Lloyd's report was quoted, which put the capacity of American yards at from 4,500,000 tons to the 5,000,000 estimate of Mr. Hurley. Lloyd's, it was stated, did not take into consideration the plans for speeding up work in the yards.

Facts concerning the activities in shipyards, where government contracts are being handled, were presented. There are now 118 yards, which are 95 per cent completed, and in them are 716 ways, 416 for steel ships, and 300 for wooden ships. On December 22 there were 171,274 men employed in shipyards, as compared with 105,497 in October. It has been estimated that at least two wooden ships will be constructed on each way during the year and three to four steel ships. Plans are making to provide sufficient ways for all new construction possible with the materials obtainable.

Ship-builders are being urged to put on three shifts a day, and in some this program has been adopted. A campaign has been started to obtain sufficient men for the three shifts. At least 382,000 more workers will be required.

Charges that "Steel Trust" officials blocked a plan by which the government was to get steel for ship plates at one-third less than it is paying were made before the Senate committee to-day by L. P. Featherstone, president of the Texas Steel Company.

Featherstone proposed to sell to the government ore lands in Texas and coal properties in Alabama and erect a steel plant at Beaumont to make steel ship plates at about \$45 a ton, as against \$65 that other steel companies are charging the government. This plan, he said, was referred by the Shipping Board to the Council of National Defence and thence to a sub-committee on which were C. M. Schwab and other officials of large companies.

"They turned me down on the excuse that the government was not prepared to go into business for itself," said Featherstone. "I might not have expected anything different from the crowd of dollar-a-year men who were beneficiaries of high prices. There has not been an independent concern in the United States large enough to permit the government to be free from the men who control the steel output since Roosevelt surrendered to Frick and Gary and allowed them to take over the Tennessee Coal and Iron Company."—*N. Y. Times*, 11/1.

MERCHANT CAPTAINS WARNED.—Complaints that American merchant ship captains have not cooperated with commanders of convoys and with naval gun-crew commanders caused the Department of Commerce to issue instructions to-day to merchant officers to follow the directions of their naval associates in every instance where they are prompted by military necessity. Disobedience of the instructions, it is pointed out, will cause the withdrawal of merchant officers' licenses.

The instructions make clear, however, that in matters relating solely to navigation and to the discipline of crews the authority of merchant captains will be upheld.—*Baltimore Sun*, 20/12.

U. S. MERCHANT-MARINE PERSONNEL.—The great work for which the Shipping Board's recruiting service was created, the building up of an all-American personnel of officers and men for the new ships, has been going on since last June. It began with the training of new officers at free schools in navigation and marine engineering at various ports on the Atlantic and Pacific coasts and the Great Lakes. At these schools about 600 men a term are being trained, the engineering term being one month, and the navigation

term about six weeks. On graduating, these students are sent to sea as reserve officers of the merchant marine, for further training, preliminary to their being licensed as mates or engineers.

By this method enough American officers have been trained in the past six months to keep pace with the demand arising from our increased merchant tonnage, not less than 3000 licenses having been issued in that time by the Steamboat-Inspection Service, which examines all candidates for licenses, under exacting requirements as to their experience and fitness. No man without proper sea experience can be licensed.

The supply of man-power from which these officers were drawn has by no means been exhausted. Our training schools for officers to-day are going on with their work with well-filled classes. We have navigation schools at Rockland and Portland, Me., at Cambridge, Mass., New York, Philadelphia, Baltimore, Newport News, and Norfolk, Jacksonville, Mobile, New Orleans and Galveston, San Diego, Los Angeles, San Francisco, Portland, Ore., and Tacoma and Bellingham, Wash.

We have free engineering schools at the Massachusetts Institute of Technology, Cambridge, the Stevens Institute, Hoboken, at Philadelphia, at Johns Hopkins University, Baltimore, at the Case School of Applied Science Cleveland, at Washington University, Seattle, and at Tulane University, New Orleans.

I submit that these facts are significant of our strength as a seagoing nation and of the virility of our new merchant marine.

The recruiting service of the Shipping Board is now engaged in an extension of its work to embrace the training of crews for our new ships, including seamen, firemen, oilers, water-tenders, cooks and stewards, in accordance with authority received from the board on December 7. On December 12 announcement of the board's training plan was made at Washington.

American seamen came forward at once to enter the new training service, not less than 500 applying at my office in the Boston Custom House in the first five days after the plan was announced, for service in what I may term the rank and file of the new merchant crews. The applications came from all parts of the country and from Americans in all walks of life. A considerable number of applicants gave evidence of education, and some stated they were college graduates. All counted it an honor to serve their country in its commercial fleets.

Our plan for preparing these men for service at sea is based on the best experience of our own and other maritime nations. It calls for the use of a squadron of training ships to take men to sea for intensive drilling in the duties of the mercantile mariner.

One ship already is in commission, another is being prepared for service, and steps are being taken to secure a third, for service in this squadron, which will have a home station at Boston. It is planned to extend this training service, if circumstances permit, to the Gulf and the Pacific Coast, with a training ship to be based on a port in each of these sections.

It is expected that six weeks of intensive drill at sea will fit a man of ordinary intelligence for duties as seaman, and a month for those of fireman. These are the two arms of the service in which there is the greatest need of capable men.

Careful thought was given to employing the most effective method of training, and it was decided that assigning a trained man of long experience to a squad of 10 men, and making him responsible for their satisfactory advancement, was the best method to pursue.

Students of the subject will recognize in this system a principle long advocated by friends of a strong national merchant marine, and successfully employed in the work of various states in training boys for the merchant service by the use of school ships, notably Massachusetts, New York and Pennsylvania. These school ships necessarily have had a limited output of graduates, and their system of training, though thorough, has been slow.

The Shipping Board's training ships expand the workable idea they represent, to meet a war emergency, and to lay the foundation of a greater merchant marine when peace returns.

None but citizens may enter the Shipping Board's training service, and the enthusiasm with which the actual work of training is being carried out seems to me to assure all-American crews for our new ships, such as have so long been the dream of all true friends of our merchant marine.—*Shipping*, 5/1.

SUGGESTIONS FOR SAFETY.—The Shipping Board has issued a booklet giving practical suggestions for traversing the war zone. The regulations cover the berthing of passengers, plugging shell holes, fastening bulkheads, tunnels, doors and other vital parts, and also the distributing of seamen's discharge books upon entering the danger zone. Passengers and seamen are warned to keep themselves warmly clothed and ready for any emergency. Copies of this publication can be had from the Government Printing Office, Washington, D. C.—*Marine Journal*, 29/12.

SHIPYARD EFFICIENCY.—In order to increase the shipyard worker's efficiency, men from the various steel ship-building plants are to undergo special training. They will be selected from different yards and undergo a period of six weeks' training. At the end of that time they will return to their respective yards and impart their knowledge to those engaged in construction work. The first class to undergo training will number about 200. The school will be held at the plant of the Newport News Ship-Building and Dry Dock Company, at Newport News, Va., which affords special facilities for training of this character. A reference to the *Nautical Gazette* of September 28, 1916, reveals the following interest displayed by that company for its operatives:

"Co-operating with the public schools and the Y. M. C. A., the company (Newport News Ship-Building and Dry Dock Company) has caused to be instituted in those buildings extensive evening school courses. All boys employed by this company are urged to attend one or more of these classes, due credit being given on the employment record for such attendance, and liberal rewards made for excellence of record. The courses embrace arithmetic, commercial arithmetic, algebra, geometry, physics, shop-sketching, plan-reading, mechanical drawing and a graded course in English. Work is also offered in English for foreigners and in elementary branches for colored boys and men."

With the foregoing as a basis one may expect good results from the new system of training.—*Nautical Gazette*, 15/11.

PERSONNEL

RETIRED NAVY OFFICERS RECALLED TO SERVICE.—The war has called back into active service nearly 500 retired officers of the navy, and 138 former officers who resigned in past years to enter civil life are now serving in the Fleet Naval Reserve.

There are 22 retired rear admirals, 18 commodores, and 34 captains on active duty, including many who have held important commands in the Spanish-American War, on service in Mexican waters, and in other operations of the navy. Seventy-nine retired commanders are in active service, 36 lieutenant commanders, 30 lieutenants, 25 lieutenants (junior grade), 28 ensigns, and many others in various other grades. One retired surgeon general, 3 medical inspectors, 6 medical directors, 8 surgeons, 5 passed assistant surgeons, and 4 assistant surgeons are on active service.

Former Secretary of the Navy Truman H. Newberry has been commissioned lieutenant commander, the highest temporary rank that could be given him under the law, and is now in command of the Naval Reserve Force of the Third District, New York.—*Official Bulletin*, 17/12.

MEN FOR FLYING CORPS.—Eight thousand men with special technical training are needed by the navy for the ground personnel of the Naval Flying Corps. Secretary Daniels has authorized the enlistment of this number, and recruiting officers have been directed to begin a drive to get the men.

There is an immediate need for mechanics for naval aviation for the ratings of machinists' mates, carpenters' mates, quartermasters, copper-smiths and blacksmiths. These men will not be enlisted for pilot's duties, but will receive special training in the building, handling, repairing and overhauling of the navy's aircraft.—*N. Y. Herald*, 12/1.

THIRTY APPOINTED AS ASSISTANT CIVIL ENGINEERS IN THE NAVY.—Thirty candidates who passed a recent examination have been appointed to fill 10 vacancies and 20 temporary positions in the grade of assistant civil engineer, United States Navy. The strength of the Corps of Civil Engineers, formerly composed of 30 civil engineers and 36 assistant civil engineers, is now increased to 96.

The 233 candidates who took the preliminary examination represented 65 colleges, universities, and technical schools, coming from 37 states and from England, Canada, Russia, France, Switzerland, and the territory of Hawaii. Of this number, 80 passed the preliminary examination and were authorized to appear at Washington, D. C., for the final. Out of the 73 reporting, 23 failed to qualify physically, leaving 50 to compete in the written examination. Thirty of these, representing 19 colleges and coming from 12 states, qualified in this final test, and have been appointed assistant civil engineers with the rank of lieutenant (junior grade).—*Official Bulletin*, 14/1.

SIXTY NEW OFFICERS OF ENGINEERING CORP.—Some 60 new officers of the naval engineering corps arrived at the Naval Academy, January 8, for a month's intensive training along that and other military lines.

Admiral Eberle, Superintendent of the Naval Academy, who is their chief during the stay of these young officers there, made a short address to them upon their arrival.

Admiral Eberle outlined the best methods of acquiring instruction while the corps is in training at the Naval Academy, where they have come to receive this instruction, and gave the young officers some good, wholesome advice.

The new engineer corps, numbering 60 officers, is quartered in Section B, Temporary Quarters at the Naval Academy.—*Evening Gazette*, 11/1.

NEW NAVAL OFFICERS.—After not quite 15 weeks' intensive training in the practical side of naval officering, between 100 and 130 young junior lieutenants, who a few months ago left their civil vocations at the call of the government, were detached from the Naval Academy. The young officers, who come from all walks of life and almost all professions and trades, were sent immediately to ships and shore stations for immediate duty.—*Baltimore American*, 10/1.

WAR SPEEDS GRADUATION OF MIDSHIPMEN.—The present "first" class of midshipmen is to be graduated on June 6, 1918, from the Naval Academy, according to information received at Annapolis, December 29.

Ordinarily this class would not have completed its course until June, 1919, but it was advanced a year in the "speeding-up" program to provide officers for the service made necessary by expansion due to the war.

A class was graduated June 18 last and another last February.—*Washington Star*, 30/12.

NAVY OFFICERS WARNED.—In order that domestic affairs may not interfere with the attention of naval officers to their official duties, Secretary Daniels has forbidden officers establishing their families in the immediate vicinity of the ships on which they are serving. The prohibition is carried in a general order which says:

"The attention of all officers of the navy and marine corps is directed to the fact that, due to the very large number of vessels to be commissioned in the near future, and to the limited number of officers available, it becomes absolutely necessary for every officer to devote his entire time and attention to the preparation of every element of the fleet for meeting the enemy.

"In order that there may be no distraction from this duty, neither officers nor men should attempt to have their families in the immediate vicinity of the vessels upon which they are serving, particularly in the vicinity of fleet bases, and the department looks with decided disapproval upon such procedure."—*N. Y. Times*, 17/1.

INCREASE IN NUMBER OF MIDSHIPMEN AT ANNAPOLIS IS URGED.—Mr. Daniels, Secretary of the Navy, recommended to-day that Congress increase the number of midshipmen which each senator and representative may appoint to the Naval Academy from three to five. Special emphasis was placed on the need for more naval officers in a letter sent by Secretary Daniels to Speaker Clark. He said that these officers ought to be trained in Annapolis, "the school which Congress has provided and employed for training line officers."

In addition to allowing five appointments to each senator, representative and delegate in Congress, the bill submitted by Secretary Daniels provides for the appointment of 100 enlisted men to the Academy.—*N. Y. Herald*, 12/1.

MARINE CORPS INCREASE.—The latest unofficial estimates are that a marine corps of 75,000 men will be required within the next year to meet all naval needs and to maintain a division of marines in France. Naturally, the corps is waiting anxiously for Major General George Barnett to appear before the naval committees of Congress and explain just how many men are needed to meet the demands on the corps in all directions.

If the navy is given the increase of 78,000 men recommended by the Bureau of Navigation and if the marine corps is increased from its present 30,000 by only one-fifth of the navy increase, that would give a total marine corps of 45,600.

The marines aspire to increase their representation in France from a brigade to a complete division, including artillery and auxiliary troops. A corps of 45,600 would not be large enough to enable them to do this, if the needs of the navy for the services of marines also are to be met.

In view of the necessity of providing replacement troops for the marine forces that may be sent to and kept in France, it is a conservative estimate that a corps of some 75,000 men would be required to maintain a division in France and for the various organizations and detachments to meet the demands of the navy for advance-base service, yards, stations, ships, etc.

In view of the high opinion of the marine corps held in Congress, it will not be surprising if authority is given at this session for increase of the corps to 75,000 men. An increase especially is necessary, aside from the immediate needs, in order that the excellent training facilities of the corps, which have practically completed the work of bringing the present force to a high state of efficiency and are not now being used to capacity, may be further utilized.—*Washington Post*, 6/1.

NAVY LIKELY TO MAN ALL TRADE VESSELS.—The manning by the navy of all vessels belonging to the merchant marine of the United States, whether such vessels are used as transports, supply ships or cargo carriers, seems likely as a result of a conference held to-day at the Navy Department between Mr. Daniels, Secretary of the Navy, Edward N. Hurley, Chairman of the Shipping Board, and Andrew Furuseth, representing the Seamen's Union.

Little has been written, although much is known of conditions prevailing on virtually all of the ships manned by members of the Seamen's Union,

conditions which not only have retarded the operation of such vessels and delayed them in transit, but conduct by men of the crews which has seriously jeopardized the property of the United States and the lives of all on board such vessels.

The Navy Department has refused positively to operate vessels which are not manned exclusively by enlisted men. The Shipping Board is known to favor the manning of all vessels which are not under the control of the Navy Department with members of the Naval Reserve, but it is prevented from carrying this arrangement into effect by an agreement made several months ago with the Seamen's Union, which does not expire until next August.—*N. Y. Herald*, 28/12.

LESSONS OF THE WAR

THE APOTHEOSIS OF THE DESTROYER.—Only a few months before the war naval opinion was disposed to anticipate the early disappearance of the torpedo-boat destroyer. It was already looked upon as a nondescript type, which had outlived its usefulness, and was fated soon to be superseded by the swift submarine, just as the destroyer itself had superseded the torpedo-gunboat 20 years before. But this view has not been borne out by the experience of the war. On the contrary, for all-round utility the destroyer to-day probably holds the palm, and it is no secret that every one of the belligerent sea powers is turning out vessels of this type as rapidly as possible. Among the German boats reported as having been in action during the present year were several bearing numbers which, in the normal course of events, would have belonged to destroyers built under the 1919-1920 program, and there is other evidence to show that between 80 and 100 new boats have been added to the German fleet since 1914. So far as this country is concerned, statements made in Parliament by Admiralty representatives leave no doubt that destroyer construction has occupied, and still occupies, a leading place in our naval shipbuilding policy, and it will not have escaped attention that many new destroyer names, such as the *Mary Rose* and *Strongbow*—lost in the recent convoy attack in the North Sea—have been mentioned in the official communiqués. The Jutland battle dispatches also specified several destroyers which did not appear in the pre-war navy lists. The truth is that the destroyer bridges an important gap in the modern naval organization. It comes between the submarine and the light cruiser, and it has certain qualities which neither of these possess at present, nor are likely to possess in the near future. Compared with the submarine, it has the advantage of superior mobility, and, in certain circumstances, of greater offensive power. From the last-named quality arises, we believe, the fact that the number of submarines sunk by destroyer attack is considerably in excess of the number of destroyers lost through submarine attack. To heavier surface ships, such as battleships and cruisers, the submarine may be a more formidable menace than the destroyer, but that it is remains yet to be proved. Even so, however, the submarine menace itself has given the destroyer a new lease of life, for the heavy ships now rely mainly on the destroyer to defend them from underwater attack.

Taking the characteristics of the destroyers built by the principal naval powers immediately before the war, we find a certain similarity in the main features, which suggests the evolution of a universal design. There were notable exceptions, it is true, but the tendency on the whole was towards a uniform standard. The displacement averaged 1000 tons, the speed ranged from 29½ to 35 knots, and the armament generally included several guns of at least 4-inch caliber, besides torpedo tubes. In the minor details there was more divergence, especially in armament. The British practice was to strengthen artillery power, while the Germans appear to have laid more stress on the torpedo, and their latest pre-war boats carried six tubes, but only a couple of low-velocity guns. In the

United States an effort was made to combine both offensive elements in the highest degree, and the 1914 destroyers carry no less than 12 torpedo tubes, in addition to four 4-inch guns. The French boats of the *Bouclier* class, launched in 1910 and onward, represented something of a compromise both in displacement and armament, for the units of this class vary from 690 to 900 tons, and are equipped with two 4-inch and four 9-pounder guns, and four tubes. Some of them attained what were then regarded as extremely high speeds, the nameship of the class having made 35.4 knots on the measured mile. Italian constructors, following, as usual, a line of their own, built several remarkable vessels, which seemed to foreshadow the fusion of the destroyer with the light cruiser. From the *Indomito* class of 1911 they proceeded to the *Carlo Mirabello* group, jumping from 700 tons to 1500, but reducing the speed from 35 to 32 knots. All the later Italian boats were heavily armed, mounting at least one 4.7-inch gun, though the number of tubes rarely exceeded three. Russia had adopted the *Novik* as the model for all her new destroyers, and had 36 boats of this class under construction on the outbreak of war. The *Novik* was 338 feet in length, displaced 1260 tons, and with engines of 40,200 horsepower had developed the remarkable speed of 37.3 knots. Her armament consisted of four 4.1-inch Q. F., several lighter guns, and six torpedo tubes mounted in pairs. Judging by these details she was one of the most formidable destroyers in existence, and her large capacity for oil fuel gave her a very wide radius of action. Among the lesser powers Chili was foremost in developing the destroyer. In 1910 she ordered from British yards a group of boats which, although classified as destroyers, were in many respects more akin to light cruisers. They displaced 1430 tons, and had machinery intended to realize 32 knots. The armament consisted of six 4-inch guns, with three torpedo tubes. Both the exceptionally high freeboard and the roomy accommodation for the crew made them very seaworthy and habitable vessels, while the fuel capacity of 500 tons was sufficient for a cruise of several thousand miles. Thus in armament, sea-keeping qualities, and radius they were equal, if not superior, to the average third-class cruiser, and had the additional advantage of extremely high speed. Turbine machinery and oil fuel are the factors mainly responsible for the striking development of the destroyer type in recent years. Great displacement is no longer essential to the attainment of high velocity, nor does the maintenance of maximum speed entail any particular hardship on the firemen or engineers. The fact that displacement has increased is principally due to the desire to mount a more powerful armament and to obtain better nautical qualities. But it has been shown that all these desiderata may be comprised in a vessel of not more than 1000 tons, and when the records of the war become available, we shall probably find that a vast amount of useful work was performed by the destroyer of moderate tonnage. Vessels of this type have been largely used for patrol and convoy duty, in place of the more costly but equally vulnerable light cruiser, and they are simply invaluable for anti-submarine work. According to the American Naval Secretary, "they are the one thing that a submarine fears."

Without a detailed knowledge of all that has occurred at sea during the war, it is impossible to forecast with any certainty the lines of future naval development. But, with this reservation, we venture to assert that the destroyer is assured of a prominent place in the category of naval weapons for a good many years yet, more especially as, for the time being at least, it is the most effective antidote to the submarine. That underwater craft will steadily grow in efficiency is not to be doubted, but years must elapse before they can compete with the destroyer in speed and handiness, and until that happens the latter will retain its high tactical value both for ordinary patrol duty and as a means of protection against the submarine. The battle of Jutland showed, moreover, that the destroyer is still to be reckoned with as a potent weapon against the capital ship.

Throughout that engagement no ship on either side fell a victim to attack by submarines, but several German ships were sunk by destroyers. As the satellite of a battle squadron the destroyer is able to perform a variety of useful services. It can blind and confuse the enemy's gunners by throwing a pall of smoke over the target, it is ready at all times to beat off torpedo attack either from below or on the surface, or itself to dash in against the enemy's swiftly-moving line and assail him with torpedoes. The submarine as yet can do none of these things. Although exact figures are not available, we believe the modern destroyer costs no more than the modern submarine, but whereas the military value of the latter is very restricted, that of the destroyer is almost unlimited. As we have observed, therefore, the destroyer, so far from having outlived its usefulness, has established itself more firmly than ever as an indispensable unit of the naval organization, and seems certain to be perpetuated as a distinct type for a long time to come.—*Engineer*, 7/12.

MISCELLANEOUS NOTES

THREE LOST ON NAVY TUG.—Three men were fatally and a fourth seriously injured in the fuel-oil fire on a navy tug at an Atlantic port yesterday, the Navy Department announced tonight.—*Baltimore Sun*, 16/12.

CUSTOMS ON PARCELS TO NAVAL FORCE IN ENGLAND.—The British Board of Customs announces that gift parcels containing dutiable goods may be delivered free of duty when intended for officers and men of the United States Navy in the United Kingdom, provided they are for delivery on board ship in which addressee is serving. When intended for members of the United States Army in the United Kingdom, parcels should be addressed to regimental address of recipient; when intended for soldiers of American nationality in British or Canadian armies or for American medical officers serving in British military or base hospitals, parcels should be addressed in care of Committee for American Soldiers and Sailors of the American Red Cross, 154 New Bond Street, London, which committee will verify right of addressee to duty-free concession and arrange for delivery of parcels. Dutiable goods must be specifically described as tobacco, cigarettes, chocolate, etc. The foregoing relates solely to dutiable goods imported by parcels post.—*Shipping*, 22/12.

THE DREADNOUGHT "TEXAS" WINS GUNNERY LAURELS.—The dreadnought *Texas* established the highest record for gunnery practice last year, the Navy Department announced to-day, and will receive the Knox trophy, which is awarded annually to battleships scoring the highest number of points.

Captain Victor Blue, who commanded the *Texas* during the practice maneuvers, has been ordered to Boston to receive the trophy from the Sons of the American Revolution.—*N. Y. Herald*, 15/1.

UNITED STATES TO CONTROL MANILA HEMP.—The government has announced its intention to take action looking to the control of the purchase and distribution of manila hemp. It is expected in the next few days details of the plan will be announced.—*Official Bulletin*, 10/1.

SIX SEAMEN KILLED; THREE HURT.—Six men were killed and three injured on the U. S. S. *Michigan* when the ship was caught in a heavy gale at sea, it was officially announced to-day.

The men were killed and injured by the falling of a cage mast, the first accident of its kind in the navy.—*Evening Star*, 7/1.

WINTER CLOTHES.—Paymaster General McGowan furnished to the committee samples of winter clothing and boots and gave positive assurance that there was an ample supply of these articles on hand. Surgeon General Braisted told the committee that the average health conditions in the navy were better than the average health of men in civil life.—*Official Bulletin*, 12/1.

MEDALS OF HONOR.—Urge your member of Congress to vote favorably upon a resolution permitting American soldiers and sailors to receive from the allied governments medals of honor awarded them for their brave and splendid work in this war.

At least a dozen such medals awarded by the British Government to officers and seamen of the naval forces operating under Vice Admiral Sims are now being held by the State Department. But the Constitution of the United States forbids their accepting any medal or other recognition of service from a foreign government, except upon the express consent of Congress.

Obviously this is a time when Congress should grant such a permission. It does not, as a matter of international courtesy, harmonize with the relationship now existing between this government and the allied governments to refuse them the right to make appropriate acknowledgment of American services in the common cause.

The Navy League believes also that the government should make known the names and the deeds of these men cited for bravery by our Allies. As history is but the shadow of great men, patriotism is largely a reflection from the deeds of brave men. We need this inspiration of the acts of these men to give us the will to win.—*Sea Power*, January, 1918.

NAVY OIL BILL IN.—A bill prepared by the Navy Department to authorize the government to take possession either by contract, lease or otherwise, upon the issuance of an executive order, of all oil land set aside as naval reserves in California or Wyoming, was to-day introduced by Senator Swanson, of the Naval Committee.—*Baltimore American*, 12/1.

AMERICANS FINISH WORK ON HAYTI MILITARY ROAD.—The military road between Port au Prince and Cape Haitien, built by the *gendarmerie* under the direction of the American army of occupation, has been finished.

Lieutenant Colonel Butler, commanding the United States Marine Corps, in charge of the work, made the first journey over the highway in an automobile at the head of a gay procession to-day.

The occasion was a holiday, the people highly appreciating the work undertaken by the Americans and thus successfully completed.—*N. Y. Herald*, 21/12.

PASSES BILL TO PROTECT MYSTERIOUS INVENTION.—The House bill for patent protection of "Garabed," a mysterious invention, said to be a source of limitless energy, was passed to-day by the Senate. It now goes to President Wilson. At the close of the last session the President gave the bill a docket veto. Garabed T. K. Giragossian, a Boston Armenian, is the inventor. He declined to reveal his secret fully until Congress protected it, and made such satisfactory explanations to the Patents Committee that they recommended passage of the bill.—*N. Y. Herald*, 17/1.

CURRENT NAVAL AND PROFESSIONAL PAPERS

UNITED STATES

WORLD'S WORK. **January.**—Must Panama Come to Sea Level? by *Philippe Bunau Varilla Lorraine*. The Test of Victory, by *J. B. W. Gardiner*.

CURRENT HISTORY. **January.**—Sinking a Battleship in Trieste Harbor, by *Percival Gibbon*.

FLYING. **December.**—Can History Tell Us How to Win a Decisive Battle? by *Rear Admiral Bradley A. Fiske*.

THE NAVY. **December.**—Pages from the Log of the Raider *Moewe* (extracts from the commander's diary), by *H. W. Hitchcock*.

AMERICAN JOURNAL OF INTERNATIONAL LAW. **October.**—Diplomatic Mission of the United States to Russia (Addresses by *Mr. Root* and the *Russian Foreign Minister*). A Unique International Problem (Spitzbergen), by *Robert Lansing*. An Economic War after the War, by *John Bates Clark*. Violation of Treaties, by *Denys P. Myers*. The American Attitude toward Captures at Sea, by *H. C. Quigley*. International Relations of Japan, China, and the United States (editorial), by *James Brown Scott*.

GREAT BRITAIN

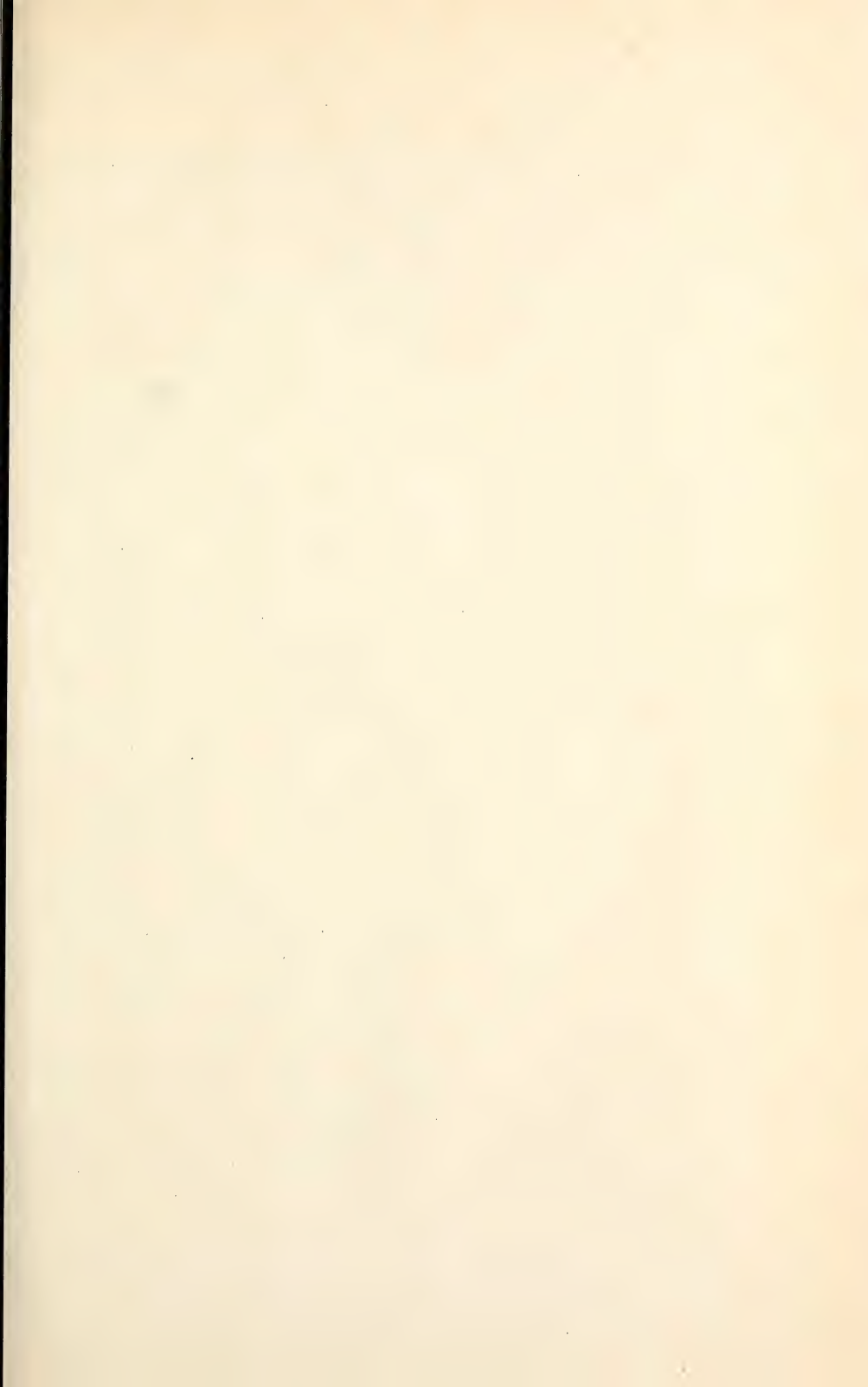
FORTNIGHTLY REVIEW. **December.**—The American Embargo, by *James D. Whelpley*.

NINETEENTH CENTURY AND AFTER. **December.**—The Invasion of Italy and the Classic Strategy of Prussia, by *Sidney Low*. The Pacifist Peril, by *J. C. de Chassaigne*. The Story of the Declaration of Paris, by *Sir Francis Piggott*.

ITALY

REVISTA MARITTIMA. **September.**—Tactics and Naval Artillery in the Battle of Jutland, by *Captain Silvio Salza*.







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WONDERFUL PHOTO SHOWS CREW ON DECK AS U-BOAT, HIT BY YANKEE DESTROYER, SINKS.

From Underwood & Underwood, N. Y.

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NAVAL WAR NOTES

PREPARED BY

LIEUTENANT W. B. JUPP, U. S. Navy

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STRATEGY

ALLIED NAVAL COUNCIL FORMED.—Secretary Daniels has given out the following announcement, cabled by Admiral Benson, regarding the Allied Naval Conference held in Paris November 29 and 30, and the agreement to establish an allied naval council:

The conference held at the Ministry of Marine, at Paris, November 29 and 30, presided over by Monsieur Leygues, Minister of Marine, and the following delegates being present:

For France, M. Jules Cels, sous-secretaire d'Etat de la Marine; Vice Admiral De Bon, chief of the general staff.

For England, Sir Eric Geddes, First Lord of the Admiralty; Admiral Sir John Jellicoe, First Sea Lord.

For the United States, Admiral Benson, Director of the Bureau of Operations; Vice Admiral Sims, commanding the American naval forces in European waters.

For Italy, Vice Admiral Cusani Visconti, sous-chef d'Etat-major general.

For Japan, Rear Admiral Funakoshi.

The Naval Allied Council.—It has been decided to create a naval allied council in order to insure the closest touch and complete cooperation between the allied fleets. The task of the council will be to watch over the general conduct of the naval war and to insure coordination of effort at sea as well as the development of all scientific operations connected with the conduct of the war. The council will make all the necessary recommendations to enable the governments to make decisions. It will keep itself informed as to the execution of plans decided upon. The members of the council will report to their respective governments as may be necessary. The individual responsibility of the chiefs of staff, and of the commander-in-chief at sea, toward their governments as regards operations and, as well as the strategical and tactical disposition of the forces placed under their command, remains unchanged. It has been

decided that the council should consist of the ministers of marine of the nations represented and of the chiefs of naval staffs.

As the meetings of the council will of necessity be held in Europe the chiefs of the general naval staffs of the United States and Japan will be represented by flag officers nominated by their respective governments. The allied naval council will be provided with a permanent secretary, etc., whose business it will be to collect and collate all necessary information, etc. The council will meet as often as may be thought necessary under the presidency of the minister of marine of the country in which the meeting is held. The various admiralities will furnish the council with the information which is necessary for the work to be carried out.—*Official Bulletin*, 15/12.

WHY GERMANY DROVE AT ITALY.—A twofold object seems to have moved the Germans in their thrust upon Italy, one expressed and one concealed. The open reason given was the punishment of Italy for her defection from the Triple Alliance and as a demonstration of Teutonic might which should move us to seek peace. The unavowed object—which the censor carelessly allowed the Vienna correspondent of the *Frankfurter Zeitung* to let slip—was the heartening of Austria-Hungary, which, we are told, was anxious for peace at any price whatever. The *Frankfurter Zeitung* says:

"The recent victories on the Italian front have destroyed the hopes of Austrian advocates of peace at any price and the small party of pacifists in Hungary who are really working for the Entente. Nobody says any more that Austria-Hungary's war is really at an end. The population knows and feels it a matter of honor to return the military assistance rendered by Germany."

Turning to the "punishment" phase, we find the *Kölnische Zeitung* writing:

"German fists and German shells are up and at it, to wreak bitter vengeance for the wrong that has been suffered, while the Austro-Hungarian forces are paying out the wicked robber and teaching him not to stretch out his hand a second time after foreign peoples and foreign soil. The grievous sacrifices to which the two central powers have had to submit, and the augmentation of their troubles by the Italian desertion, justify the satisfaction which is to-day felt everywhere in German lands at the collapse of the Italian house of cards.

"Italy ought to have begun by building schools and teaching her people to read and write, in order to be able to guide them by the road of national culture and work to comfort and prosperity, instead of pursuing a windy *Machtpolitik*, and trying to enrich herself in bad company and by unworthy means."—*Literary Digest*, 15/12.

TRUTH ON WAR CONDITIONS.—*What America Must Do to Win World War*.—By Representative Tinkham.

1—Concentrate all possible efforts on the manufacture of a huge ocean tonnage.

2—Send wheat and corn to Italy to prevent revolution.

3—Contribute a large and splendidly equipped air service.

4—Send to American bases in France a greatly increased amount of general supplies.

The unvarnished truth was told to-day in the House by Representative George Holden Tinkham of Massachusetts, with the hope that it will awaken the War and Navy Department officials and the public generally to a realization that big action must be taken now to hold the world "safe for democracy."

In telling his opinions regarding what conditions are and what should be done at once to relieve them, Representative Tinkham said:

"It seems to be my duty to address the House upon my return from war-torn Europe and to submit to it some conclusions and impart information which I hope will be of some value.

"My information has been gathered from many sources—from personal observations and from conversations with men of various nationalities in military, naval, diplomatic, political and other employment.

"America wants the truth and it is vital that America have the truth. The picture of the military situation in Europe as reproduced in America is often not true, particularly in relation to America's military efforts there and the conditions in Germany. The truth in Europe, where America is to play her great and victorious part, is that to-day the central powers have achieved all of their greater military objectives, with the exception of the taking of Paris, the attempt to take Verdun being part of that purpose.

"Autocracy in Europe has democracy by the throat and is strangling it. The reasons for the success of autocracy are that autocracy is organized, deals more in deeds than in rhetoric, and modern autocracies are masculine and not feminine. Democracy to be successful in this the greatest struggle in arms of all times must organize better than autocracy, drop rhetoric for deeds and become masculine.

Conditions in France and England.—"I found the French soldiers and people courageous and unwavering in their dauntless loyalty. There is no avoiding the truth, however, that France is war-worn and has passed her meridian in man power and effort. She has plenty of food, with the exception of wheat and sugar. She has excellent military and political leadership.

"I found England's war efforts splendidly organized and her equipment complete. The English army is cheerful and confident. Large losses, such as 200,000 men in the last two months, I have heard criticized as unnecessary. The truth, however, is that England is at the height of her power, but it is a height which she can maintain, undoubtedly for one or more years. Under these circumstances, after three years of fighting, it seems impossible for France and England to obtain a military decision, and France and England frankly admit the absolute necessity of a colossal effort on the part of America.

"Much evidence shows that, although Germany is very short of food, she is not starving, and that the food situation in Germany is not as bad in some essential particulars as it was a year ago. There is also much evidence that Germany to-day has a larger number of men under arms than at any other time during the war, although their quality is not as good as formerly. The real social and political conditions in Germany are not much known, but it is not thought that there will be a revolution until after the war.

"The results in France of American efforts up to the first of December, in a strictly military way, have been practically negligible. The number of men there is much smaller than the American public believes; and although food and clothing were good in amount and quality, the lack of general supplies has a most demoralizing effect upon all preparations and efforts. I am not speaking of American artillery, aeroplanes, machine guns and ammunition, about which the American public now knows, but of such supplies as auto trucks, machinery, tools, wood, nails, camp kitchens and many other absolutely essential things.

"I saw some of the finest trees in France being cut for lumber. Modern war cannot be carried on without lumber in large amounts, yet there was not sufficient lumber to be used by the French and English troops in France. It is my fixed opinion that the sending of more American troops without adequate general supplies will be a disastrous blunder.

"The situation in Italy on the economic side is very perilous. All of the people north of Rome live on wheat and corn meal, and on the 1st of December there were only three months' supplies on hand. Unless America

is able to supply wheat and corn meal to Italy in sufficient quantities before it is too late a revolution such as occurred in Russia will not be unlikely.

"The submarine situation is much more acute than the people are allowed to believe. The total allied tonnage sunk per month which is not totaled for publication exceeds the new tonnage launched, and this has been so for many months, and will exceed the new tonnage launched until July 1, even if the plans of the allied governments are all carried through successfully. The Mediterranean is practically controlled by the submarines and the number of submarines and their efficiency seem to be increasing, although the American and British efforts against the submarines have been crowned with much success.

One Supreme Commander Needed.—"It is thought by those best informed on military matters that a supreme commander of all military efforts of the Allies should be chosen and given full power and authority.

"The best informed men in France and England believe a decisive military decision cannot be reached before 1919 or 1920, when America will be able to contribute her real military strength.

A War of Transportation.—"The war for America is a war of transportation, and America should concentrate all possible effort on the manufacture of a huge ocean tonnage. Wheat and corn should be immediately sent to Italy to prevent a revolution; America should contribute a large and splendidly equipped air service, and America should at once send to American bases in France a very much increased amount of general supplies.

"The winning of the war rests completely in the hands of America, in her forests, her furnaces, her farms, her men, her energy and her will. This war, cost what it may, in blood or treasure, strength and sacrifice, must be won for America's honor and America's future."—*Washington Evening Star*, 17/1.

THE INERTIA OF MODERN WAR.—The inexorable law of inertia, operating on the vast machinery of this war, forbids a decisive victory between armies that are equal, or even approximately equal, in numbers, munitionment, morale and leadership. A dozen battles have been fought since August, 1914, all of which were greater than any recorded in history, and any one of which would have been absolutely decisive in any era but our own.

Nobody seems to have foreseen this—not even the nation which for 40 years past has dreamed of war conquests, and made the military subjugation of other races the great goal of its national life. For we find in a book on the lessons of the war recently written by a distinguished German general, the astonishing confession that no absolutely decisive battle can be fought between equal and well-entrenched national armies, such as those now confronting each other on the western front.

Although this writer does not give us the reasons for his belief, they are not far to seek. It is the law of inertia applied to the enormous mass of a modern army that has pinned it fast, and put a heavy discount upon such shrewd, elastic and ever-daring strategy as that of the great Napoleon, and such lightning-like tactics as those of the veteran army that fought under him.

This is a war of artillery—heavy, semi-mobile artillery. In Napoleon's day artillery (light field artillery), was an adjunct of the infantry; to-day infantry is an adjunct of the artillery. The heavy artillery (6-inch to 12-inch) obliterates the enemy's defences; this done, the infantry takes possession. No further advance can be made until the inertia of the huge mass of guns, shells, ammunition dumps, railroad yards, tracks, machine shops, etc., has been laboriously overcome by ceaseless, herculean pressure, exerted for days, weeks and months. Finally when the full momentum has been attained it is expressed in days of "hurricane" bom-

bardments. Then the infantry can go forward—and they must only go so far.

Woe to that army which disregards this law of inertia. The British forgot or disregarded it at Cambrai. They moved far beyond the protecting arm of their heavy artillery—and paid the price. Not until they swung back within its shelter could they stand. When the tanks swept through the Hindenburg line, it looked as though a modern line could be permanently broken. So on they went, "horse, foot, and artillery," leaving the heavy stuff to come on at its leisure.

The British heavy artillery will ultimately take Cambrai and the infantry will consolidate and hold the position; but we think this recent venture will be the last attempt to introduce on the western front the open fighting of earlier wars. It simply cannot be done.

It is a curious paradox that a preponderance of heavy artillery at once makes victory possible and a decision impossible. It was an enormous preponderance of heavy artillery that enabled the Germans to break through the Russian lines at the Dunajec. It was the inertia of this artillery that prevented the victors from splitting up, encircling and capturing the Russian Armies—and so rendered the result indecisive.

The war will be won by the decimation of the German Armies *in situ*, by the allied preponderance of artillery. Even though they seek to save their diminishing man-power by remaining on the defensive—they must hold their lines, and in so doing must be subject to an overwhelming shell-fire attack from which there is no escape.

We can make no more important contribution to the allied cause than to mobilize every possible forge, factory and machine shop for turning out artillery of heavy caliber.—*Scientific American*, 29/12.

GERMANY PLANS AERIAL WARFARE ON GREAT SCALE TO MEET U. S. FLIERS.—With the American Army in France, Friday, January 4.—Germany's plan for aerial warfare on a larger scale than heretofore, it is indicated in documents taken from enemy prisoners, are founded upon published statements regarding the aerial warfare plans of the United States. Information to this effect has reached the American expeditionary forces.

It is indicated that the Germans, believing that America intended putting machines by the tens of thousands into the battle arena, immediately enlarged their own plans in the expectations of offsetting the increased enemy forces. Just when the enemy's program will be realized is uncertain, but the information obtained in captured documents is regarded by ranking officers as making it extremely desirable for a speedy and complete development of American air service.

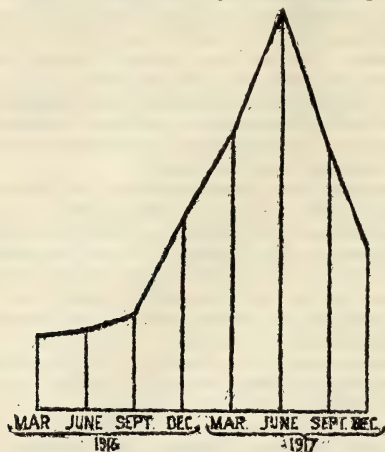
In cooperation with the Red Cross, Y. M. C. A. headquarters is busy completing arrangements for other centers than Paris; here the personnel of the American expeditionary forces can go when they are given leaves and have clean and healthy amusements such as movies, baseball, football, mountain climbing and other sports. It is hoped that these centers will prove substitutes for Paris, as permits to spend leave there have been suspended to all officers and men in the interests of temperance and morality.—*Washington Post*, 6/1.

EXPLAINS U-BOAT WAR.—The British Admiralty, on December 20, sent a statement to the press elucidating some remarks made in the House of Commons a week before by the First Lord, Sir Eric Geddes, on the losses suffered in the U-boat campaign by the merchant marine of the Allies and neutrals, together with the losses inflicted on Teutonic submarines. Sir Eric had said:

1. The demands on our merchant shipping are greater than ever.
2. The submarine menace is held, but not yet mastered.
3. Our shipbuilding is not yet replacing our losses.

4. I deprecate the drawing of deductions from the experience of any one week or month, be it good or bad. It is upon the general curve of all the factors that we must base our conclusions.

5. The downward trend of mercantile marine losses, both of ourselves and our allies, has continued satisfactory since I last spoke on November 1.



QUARTER ENDED. LOSSES OF MERCHANT TONNAGE.



QUARTER ENDED. GERMAN SUBMARINES SUNK.

6. The upward curve of merchant shipbuilding has also continued satisfactorily, and this curve will undoubtedly be maintained in an upward direction.

7. The upward curve of the destruction of enemy submarines has continued equally satisfactorily.

Subsequently Washington announced that the average rate of destruction of U-boats was 1.25 a day, or about 38 a month, while the German rate of construction was .75 a day, or about 23 a month. The statement of the British Admiralty with the diagrams above which accompanied it follows:

"In view of the statement made by the First Lord in the House of Commons on Thursday, the 13th inst., that the general curves of merchant tonnage sunk by enemy action and of German submarines sunk are satisfactory, it has been thought that the public would be interested to see these curves, and they are placed at the disposal of the press accordingly.

"With regard to the upper diagram, the height of the enemy submarine attack upon merchantmen was in April, 1917, and that accounts for the quarter ended June showing the 'peak,' since when the curve has steadily fallen, and in the last quarter of this year has reached the same figure as in the last quarter of 1916, which was before the unrestricted submarine attack began.

"The lower diagram shows that since the quarter ended September, 1916, there has been a steady rise in the number of submarines sunk, and although for the last quarter of 1917 the number sunk has not further risen, it must be remembered that there are still the results of half a month to add, and we have already equaled the results of the quarter ended September, 1917.

"Attention is particularly drawn to the notes at the foot of the diagrams, which explain that they are statistically accurate and drawn to scale, but that obviously the scale is not the same in both, the upper being for tonnage of merchant vessels and the lower for the number of submarines."

—*N. Y. Times*, 15/1.

U-BOATS PREYING ONLY ON SLOW SHIPS.—Commander Bellairs was recently quoted as saying in the House of Commons that, according to American figures, of merchant ships of under 9 knots, 90 to 100 per cent were sunk by submarines; of 9 and 10 knots, 70 per cent; 12 knots, 50 per cent; 18 knots and above, none. The *Lusitania* was the only vessel of high speed sunk. Supplementing this information, the British Admiralty reports that of the British tonnage actually sunk in September and October, about one-eighth only consisted of ships carrying food, over one-third of ships carrying coal, and the remainder of ships carrying miscellaneous commodities, or ships sailing outwards in ballast. It would appear from this that only the slow-moving cargo boats are succumbing to U-boat attacks.—*Nautical Gazette*, 3/1.

TRUE STATE OF GERMANY.—From the victory of the Allies at the Marne, that witnessed the first close cooperation of the British and the French in numbers, to the present time the outcome of the war has been a settled conclusion. That victory that absolutely shattered the cardinal point of German strategy, namely, to reach Paris in 30 days by way of devastated Belgium, will stand out in history as marking the turn of the tide against the Germans. They staked all on one throw after it was seen that England could not be prevailed upon to permit France to be throttled. And that cast was against them. Since then the war from the German side has been a stupendous effort to stave off the day for the Allies by piling up an unthinkable war equipment and marshaling the nation itself to arms. And every day the grim, cold and unsentimental British blockade has been strangling the German nation. Never for a moment has England made a distinction between the German Government and people such as was important for the United States to make in the interest of democratization of the German Empire. And the German people have felt the squeeze until their tongues literally are out and they are ravenous for food and rabid for peace.

All the while the hard ring of French and British artillery has become harder and harder. Penned in behind the lines, that are the real lines of invincibility and not those of Hindenburg, the Germans have scurried from point to point. They could not break the iron ring of France and England. They were more successful with that of Russia through chicanery and deceit, through fraud and corruption. And that is the reason

why the British premier, Lloyd George, in his address laid at the door of Russia its blood-guiltiness and declared that the Russians must work out their own destiny.

England has suffered in multi-thousands of killed. France has suffered to the point of critical sacrifice because of the defection of Russia. Not the Russia of Kerensky, but the Russia of the Bolsheviki, the radical overthrowers of all organized society in the name of liberty. As the best exponents of liberty Russia has now to offer, the United States must look beyond them to Russia itself. It, therefore, has no antagonisms but friendships to proffer. It does not, it will not and it cannot regard the Bolsheviki as presenting the best program of democracy for Russia, not to say the world. The crude internationalism of the latter has saving features that in time will find incorporation in the general democratic program for all free peoples.

The Germans turned to their submarines for the victory they found themselves unable to achieve on land. Having sought to carry the war into Egypt and to seize the Suez Canal and to split the British Empire, and failed, they turned back to the sea. Beaten in the west, beaten in the east, reaping some harvest of success from the Russian defection, but a veritable Pandora's box of ills as well, they see even the submarine failing them. The one tragical fruitage of the submarine warfare for Germany was the entrance of the United States into the strife. And from that hour the doom of the submarine warfare was sealed.

What has Germany left to which to turn? It has still resources open to it of making a break with its fleet. But its foes have multiplied their sea power, already overwhelming, while Germany has been so bent upon building the submarines that have counted nothing for it in the outcome, as to be unable to carry on a considerable program for ships of the major orders. A dash with the fleet would be a dash to death. There remains now only the much talked of proposed gigantic west-side offensive. This may occur. But it will not occur before spring or summer, and then it will be a supreme act of national suicide. Between now and spring the gullet of the Germans—and who that is human does not have pity for the deluded or guileless of them who clamor for bread and are given a stone—will be well nigh closed. The true case for Germany is marked by the true state of Germany. It is a state of awakening from illusions, of abject and gnawing want and hunger, of revolt against the servility that has marked the German through this training for generations. The soul of free Germany is being born in the agonies of unparalleled suffering and the militarists cannot stifle this soul at its birth by their rapacious and inhuman calls for blood, for more blood, for reckless, wasteful shedding of blood—to no purpose!—*Baltimore American*, 12/1.

U-BOAT OPERATIONS.—In the present war, submarines have been employed for the first time as commerce destroyers. As such, they have proved themselves far more effective than warships, which can only traverse the surface of the seas. According to Captain Persius, the well-known German naval authority, the cruiser *Karlsruhe*, during her short-lived career, inflicted more damage on Entente shipping than any of the other German surface raiders. This vanished unit of the Kaiser's navy destroyed 17 vessels in all, representing 76,609 tons. Next in record to the *Karlsruhe* comes the cruiser *Emden*, which, in her spectacular cruise, sank 17 vessels of an aggregate tonnage of 73,895 tons. On her first raiding expedition, the *Moewe* bagged 15 ships, with a total tonnage of 57,746 tons.

These achievements of the German surface cruisers appear comparatively insignificant, however, alongside the toll taken by individual U-boats. At the head of the list stands the one commanded by Lieut. Commander Valentiner, which, according to German reports, was responsible for the destruction of 128 vessels, with an aggregate tonnage of 282,000 tons.

Estimated on a conservative basis, the value of these ships, with their cargoes, was probably not far from seventy millions of dollars. A close second is the submarine of which Captain Arnauld de la Pi  re was commander, with a record of 126 ships and 270,000 tons sunk. In case Germany's ruthless submarine campaign should be continued in the future with the same unabated vigor as in the past, it is possible that even these figures may be surpassed hereafter.—*Nautical Gazette*, 20/12.

ATLANTIC

TWO ON "JACOB JONES" TAKEN PRISONERS.—Two sailors were saved by the Germans from the American destroyer *Jacob Jones*, according to an official German announcement received December 18.

The *Jacob Jones* was torpedoed and sunk in the war zone on December 6 and 65 men on board were listed as missing. Survivors reported that one American who spoke German was taken away a prisoner on the submarine.—*Baltimore Sun*, 18/12.

LINER SINKS U-BOAT.—A German submarine was sunk by the fire of guns of an American passenger steamer approaching the British coast December 27, according to reports of the passengers and gunners aboard.—*Baltimore Sun*, 29/12.

UNITED STATES SUBMARINE "F-1" RAMMED AND SUNK BY THE "F-3" IN HOME WATERS.—Secretary Daniels authorizes the following:

The United States submarine *F-1* was rammed and sunk by the United States submarine *F-3* in a fog in home waters. The *F-3* was not injured and returned to port with five survivors of the lost vessel. Nineteen of the crew of the *F-1* are missing.—*Official Bulletin*, 19/12.

REPORT MYSTERIOUS GERMAN VESSEL OFF BRAZILIAN COAST.—Brazilian newspapers received December 27, are filled with accounts of the movements of a German corsair off the Brazilian coast a few weeks ago. The newspapers assert that the mysterious vessel was identified as a German, and that she unloaded an immense cargo of heavy cases at Cerqueira and Armacao.

Several days later the vessel returned to Armacao with additional cargo, which the newspaper accounts say it is believed she received from a larger ship out of sight of land. From Armacao the vessel proceeded to Calouro, where another portion of the cargo was unloaded.

These ports are not guarded, and it is asserted that the cargoes landed were mysteriously smuggled away. Later the German vessel was sighted close to shore at San Pedro de Aldera, where two persons are now under arrest as a result of their relations with the crew. They are accused of being spies.

The newspapers say the corsair disappeared as mysteriously as she came and that the Brazilians believe she brought supplies for a submarine base.—*N. Y. Herald*, 20/12.

DETAILS OF FOUR-HOUR SEA BATTLE WITH U-BOAT AS REPORTED BY THE "LUCKENBACH'S" COMMANDER.—A detailed account of the four-hour battle with the German submarine which attacked the American steamer *J. L. Luckenbach* on October 19 is given in the report made to the Navy Department by the commander of the armed guard on that vessel, which, though hit several times by shells, reached port safely.

At 7.30 a. m. the after lookout on the *Luckenbach* reported a steamer abeam. The commander of the armed guard sighted her himself about one point forward of the port beam. Upon looking at the steamer, which appeared very suspicious, through the glasses, a sail appeared on her. Both guns were trained on the steamer. The armed guard commander

then went aloft to obtain a better view. When he was halfway up the supposed steamer turned out to be a submarine and opened fire.

The *Luckenbach* immediately opened fire with both guns. The first two or three shots fired by the submarine fell about 2000 yards short. She was firing at long range. The *Luckenbach's* shots also fell short. As the submarine appeared to be closing in, the captain was told to put the stern of the *Luckenbach* to her, which he did. Distress signals were sent out by wireless.

The submarine closed in to about 2000 yards. Early in the battle one shot from the submarine landed on the deck forward on the port side and exploded in the gun crew's quarters, starting a fire which partially destroyed the quarters and burned the effects of the gun crews. The same shot burst the fire main. The fire main was blocked off and water finally got to the fire. Steam was also turned on the flames. Shortly after the first shot landed another shot struck the quartermaster's room, without doing much damage.

A shot landed near the stern and exploded, putting the after gun out of commission.

"At least 225 rounds were fired by the submarine, out of which there were only nine clean hits," the commander reports. "Pieces of shell were falling all around the deck. Two shots landed on the port side forward, striking the oilers' room and putting a large hole in the side; one landed on the port side at the water line, hitting the fresh-water tank and destroying most of the fresh-water supply. Another landed in the petty officers' mess room and exploded, putting the ash hoist out of commission and bursting the steam pipe, also wounding two men, one mess boy, and one fireman. One shot passed through the weather screen on the bridge and landed in the cargo, exploding but not starting a fire. Pieces of shell hit V. Louthier, one of the armed guard, in three places. One of the ship's crew, who was carrying ammunition forward, was hit. Another shell exploded in the engine room, wounding the first and third engineers and putting the engine out of commission. Bell, one of the gun's crew, was going up the forward ladder carrying ammunition when the shell that landed in the quartermaster's room exploded, the fumes from the shell blinding him for about two hours."

"*Never Surrender!*" *Flashed by Radio*.—The distress calls sent out had been answered by a United States destroyer at 8.10, which was asked how quickly it could arrive at the scene. "Two hours," was the reply. The captain of the *Luckenbach* said: "Too late. Look for boats." "Don't surrender," came back the message, and the *Luckenbach* replied: "Never."

At about 11 a. m. smoke was sighted on the horizon. The vessel was headed toward the smoke to lessen the distance the destroyer would have to come. It was shortly after this that the engines were temporarily put out of commission by an explosive shell. At about 11.30 the destroyer fired her first shot at the submarine, which submerged 10 minutes later.

The *Luckenbach* had commenced firing about 7.40 and ceased firing at 11.40, 202 rounds being fired at the submarine.

"The ship's crew behaved creditably, no trouble being experienced in getting them to pass ammunition," the commander of the armed guard reports. "The firemen stayed below. Great praise is due the armed guard for the manner in which they performed their duty. The men stationed at the guns never flinched. When the after gun was put out of commission the after pointers came to the forward gun and relieved one another, as 167 rounds were fired out of the forward gun. H. Bolges, chief boatswain's mate, was a great help, doing most of the spotting from the top of the wheelhouse while the armed guard commander was taking care of things around the decks and guns."

The destroyer stood by until the engines were repaired, which took about two hours and a half, and then escorted the *Luckenbach* to a convoy, which was reached about 5 p. m.

All the members of the armed guard on the *Luckenbach* have been commended by the Navy Department for gallantry and devotion to duty, and the commander of the guard has been promoted, being given a temporary warrant as boatswain.—*Official Bulletin*, 14/1.

DESCRIPTION OF SINKING OF GERMAN U-BOAT AND CAPTURE OF ITS CREW BY TWO AMERICAN DESTROYERS.—Secretary Daniels to-day made public further details, given in reports of officers, of the destruction of a German submarine and the capture of the crew by American destroyers in November. The capture was made by the U. S. S. *Fanning*, assisted by the U. S. S. *Nicholson*. The *Fanning* was commanded by Lieutenant A. S. Carpenter, Lieutenant G. H. Fort being the executive officer.

About 4.10 p. m., while escorting a convoy, the lookout of the *Fanning*, Coxswain David D. Loomis, sighted a small periscope about a foot above water some distance off the port bow. The periscope was visible for only a few seconds. The destroyer immediately headed for the spot and three minutes after the periscope had been sighted dropped a depth charge. The *Nicholson* also speeded to the position of the submarine, which appeared to be headed toward a merchant vessel in the convoy, and dropped another depth charge. At that moment the conning tower of the U-boat came to the surface between the *Nicholson* and the convoy. The *Nicholson* fired three shots from her stern gun. The bow of the submarine came up rapidly. She was down by the stern, but righted herself and seemed to increase her speed. As the *Nicholson* cleared, the *Fanning* headed for the U-boat, firing from the bow gun. After the third shot the crew of the submarine all came on deck and held up their hands, the submarine surrendering at 4.28 p. m.

The *Fanning* approached the submarine to pick up the prisoners, both destroyers keeping their batteries trained on the boat. A line was got to the submarine, but in a few minutes she sank; the line was let go and the crew of the U-boat jumped into the water and swam to the *Fanning*.

Although the crew all wore life preservers, a number of them were exhausted when they reached the side of the destroyer. As the submarine sank, five or six men were caught by the radio aerial and carried below the surface before they disentangled themselves. Ten of the men were so weak that lines had to be passed under their arms to haul them aboard. One man was in such a condition that he could not even hold the line thrown him. Chief Pharmacist's Mate Elzer Harwell and Coxswain Francis G. Connor (N. N. V.), jumped overboard after this man and secured a line under his arms. When he was hauled aboard every effort was made to resuscitate him, but he died in a few minutes. The four officers of the submarine and the 35 members of the crew were all taken prisoners.

After being taken on board the prisoners were given hot coffee and sandwiches. Though kept under strict guard, they seemed contented and after a short time commenced to sing. To make them comfortable the crew of the destroyer gave them their warm coats and heavy clothing.

The German officers said the first depth charge had wrecked the machinery of the submarine and caused her to sink to a considerable depth.

The submarine bore no number nor distinguishing marks. She was identified by life belts and by statements of an officer and men of the crew. One of the life belts had "Kaiser" marked on one side and "Gott" on the other.

The *Fanning* proceeded to port and transferred her prisoners under guard. As they were leaving in small boats, the Germans gave three cheers. The commanding officer of the *Fanning* read the burial service over the body of the dead German sailor, and the destroyer proceeded to sea and buried him with full military honors.

The commander of the *Fanning* reports that the conduct of all his officers and crew was excellent.

The British commander-in-chief, under whom the destroyers were operating, in a report to the British Admiralty, said: "The whole affair reflects credit on the discipline and training of the United States' flotilla," and added that the incident showed that the *Fanning* "is a man-of-war in the best sense of the term, well disciplined and organized and ready for immediate action." He concludes that the credit for this must be given her commander. He mentions as worthy of particular commendation Lieutenant Henry, deck officer of the *Fanning*, the coxswain who sighted the periscope, and the chief pharmacist's mate and coxswain who jumped overboard to rescue the drowning German.

The British admiral also commends the prompt action of the *Nicholson*, which completed the success of its sister ship.

The British Admiralty sent a telegram to the commander-in-chief directing him to express to the commanding officer, officers, and men of the *Fanning*, its "high appreciation of their successful action against enemy submarine."

Vice Admiral Sims, commander of the American forces operating in European waters, issued an order commending the officers and men of the *Fanning* and *Nicholson*. Coxswain Loomis was advanced to the next higher rating in recognition of his vigilance in sighting the periscope.—*Official Bulletin*, 31/12.

EXTENSION OF SUBMARINE ZONE.—Germany has extended her submarine zone to include the waters around the Cape Verde Islands, Madeira and a portion of those of French Senegal, all off the northwest coast of Africa. Through these waters lay important trade routes from the Pacific and Indian Oceans, South Africa and South America to Europe.—*Baltimore American*, 10/1.

HONORED FOR SINKING AMERICAN DESTROYER.—Emperor William has conferred the Order Pour le Merite on a submarine commander, Kophamel, on his return from a cruise to the Cape Verde Islands. During this cruise, Kophamel asserts, he sank an American destroyer and 14 merchantmen, most of them bound from the United States for Italy or France. He is said to have brought back 22 tons of copper as booty.—*N. Y. Herald*, 10/1.

DEPTH CHARGES ARE SMASHING U-BOATS.—"One of our submarines shot a heavily-laden steamer of 5000 tons out of a convoy. A violent enemy counter-attack followed.

"The destroyers left the convoy and followed the submarine and in the course of a few minutes dropped 39 water bombs around the spot where the U-boat was supposed to be submerged. Luckily they failed to hit her and our U-boat escaped unscathed.

"The same submarine was previously followed by two airplanes from midday until evening and pelted with 23 bombs but escaped."

The same newspaper contains an account of a submarine cruiser which had a narrow escape from destruction in the explosion of a munition ship which she torpedoed from too close a range. The steamer, runs the account, blew up, "with a terrific detonation, wrapped in a column of flame, and the next second the flames disappeared and the steamer was gone."

The force of the explosion upset the submarine's steering apparatus and did other damage, but the crew finally succeeded in effecting repairs so that the U-boat managed to get into port.—*Baltimore American*, 16/1.

SUBMARINE IN SOUTH ATLANTIC.—On December 9 there was a rumor in Buenos Aires that a German submarine had been seen in the Atlantic, somewhere off Rio. On the following day the Spanish Premier made an official announcement that the Spanish steamer *Claudio*, bound from America for Spain, had been bombarded by a German submarine. On

December 14 a Lisbon cable stated that Funchal, Madeira, which is on the route from the English Channel to the Cape Verde Islands, was bombarded by a German submarine, 40 shells having been fired and a number of persons injured.

Some of these incidents may have been identified with the submarine that was commanded by Commander Kophamel.—*New York Times*, 6/1.

SUBMARINE SIGHTED IN GULF OF MEXICO.—Guards have been stationed at all coast artillery batteries here to-day and a close watch is being kept on all shipping following wireless reports that a submarine had been sighted by two American patrol boats 100 miles south of the Galveston Bar.

Military authorities declined to discuss the report further than to admit such a report had been received.

All coast artillery troops absent on leave were immediately summoned to man batteries.

The report received said that the submarine mounted two guns and that it submerged and was not seen again when the American patrol boats gave chase.

Navy Has No News.—Washington, January 14.—The Navy Department was without information to-day of the hostile submarine reported seen in the Gulf of Mexico.—*Baltimore American*, 14/1.

AMERICAN TRAWLER LOST.—Washington, January 14.—An American trawler operating in European waters has been lost by striking a rock. Admiral Sims reported the sinking of the little vessel to the Navy Department to-day. All members of the crew were saved.—*Baltimore American*, 15/1.

FOURTH LUCKENBACH STEAMER TORPEDOED.—New York, January 7.—The American steamship *Harry Luckenbach* has been torpedoed and sunk with loss of life, according to word received by the owners of the vessel to-day.

Eight of the crew are missing, the owners were informed. The crew consisted of 30 men, not including the naval guard.

When last heard from by the owners the *Harry Luckenbach* was in France, having been requisitioned at a French port October 15 by General Pershing for use as a supply ship of the United States Shipping Board. It is believed she was sunk in the English Channel.

The vessel was in command of Captain F. S. Jones. No information as to the identity of the eight men reported missing has been received.

The *Harry Luckenbach* was built in 1881 at West Hartlepool, Eng., under the name of the *Surrey*, and was also known as the *Michigan* before her purchase by the Luckenbach Steamship line. She was registered at 2798 tons gross.

The *Harry Luckenbach* is the fourth ship of the Luckenbach line lost through submarine attack since the war began. The others were the *Jacob Luckenbach*, sunk July 7, 1916; the *Lewis Luckenbach*, October 14, and the *D. N. Luckenbach*, October 27 last year. Five members of the crew of the latter were killed. Another ship of the same line, the *J. L. Luckenbach*, had a four-hour running fight with a submarine the same month but escaped, although a number of her crew were killed by shell-fire. The total gross tonnage of the four ships sunk is 12,508.—*Baltimore American*, 9/1.

"COME AND GET ME"; NIGHTLY TAUNT TO U. S. DESTROYERS.—Commanders and crews of the American destroyers operating in European waters are talking about a grim piece of Hun humor. Nearly every night the commander of one of the destroyers receives by wireless a message reading:

"My position is (so many) degrees north and (so many) degrees west. Come and get me. I'm waiting for you." The message is always signed Hans Rose.

Rose is the German who took a submarine into Newport two years ago, welcomed society aboard his craft and then went out and sank several steamships almost within shooting distance of Nantucket. According to the story passed around by the men engaged in the thrilling and hazardous task of seeking submarines, the captain to whom is directed the nightly messages of the German subsea craft sank two. The commanders of both were intimate friends of Rose. He has sworn vengeance. Not only does he send his taunting message to the man he has never seen, but he goads him further by flashing a message defining the position of the destroyer.

It is disquieting for the American commander, but he has no fears. Twice, it is stated, he has swiftly guided his craft to the location described by his enemy, but has found nothing and seen nothing. Still the mysterious wireless dispatch comes every night, no matter where the destroyer may be. Others catch it, and thus the weird story is told wherever the hornets of the sea are seen.—*N. Y. Herald*, 17/1.

BAGLEY RECORDS HEROISM OF HIS MEN.—Secretary Daniels to-day made public a summary of the report made by Lieut. Commander David W. Bagley on the sinking and loss through German submarine attack of the American torpedo-boat destroyer *Jacob Jones*, of which he was the commander, on December 6. The location of the destroyer when attacked is not disclosed, but from the fact that Commander Bagley and four others were able to go in a motor dory to the Scilly Islands, it is still believed here that the attack occurred at a point in the Atlantic nearer to those islands than to any continental port.

Commander Bagley has especially commended the work of the following officers and men of the *Jacob Jones*:

Scott, Lieutenant Norman, St. Louis.

Richards, Lieutenant J. K., Washington.

Kalk, Lieutenant S. F. (Junior Grade), Washington.

Gates, Lieutenant Nelson N. (Junior Grade), Bay City, Mich.

Charlesworth, Charles, boatswain's mate, first class, New York.

Burger, Philip J., seaman, second class, Lansingburg, N. Y.

Kelly, Laurence J., chief electrician; next of kin and home address not given in department records.

Chase, Howard U., Quartermaster, third class, Nantucket, Mass.

Gibson, Harry Louis, chief boatswain's mate, Philadelphia.

Meier, Edward, water tender, Bay City, Mich.

Bagley's Report Summarized.—The summary of Commander Bagley's report was made public as follows:

The destroyer *Jacob Jones* was struck by a torpedo at 4.21 p. m. on December 6, 1917. The torpedo was sighted about abeam when at a distance of approximately half a mile. The officer of the deck, Lieutenant S. F. Kalk, who afterward died of exposure, took prompt and efficient measures to maneuver the ship so as to avoid being struck by the torpedo.

The commanding officer and Lieutenant Norman Scott, the executive officer, who were in the charthouse, heard the warning call that was given on the sighting of the torpedo and jumped at once to the bridge, where the commanding officer continued the maneuver begun by Lieutenant Kalk.

The commanding officer realized immediately that the torpedo was too near to allow time for the destroyer to maneuver clear of it. The torpedo struck abreast of a fuel oil tank, and immediately three large compartments were flooded, the deck over the fuel oil tank blown off, and the ship and fittings damaged in other ways. The ship quickly settled by the stern, and the engine room was soon flooded.

As the radio antennae and mainmast were carried away, and electric power failed immediately, it was not possible to use the radio apparatus. Two signal shots were fired from one of the guns. Immediately after the ship was torpedoed, and it was realized that she would sink, all efforts were bent toward launching rafts and boats, also splinter mats and lifebelts.

The gunnery officer, Lieutenant J. K. Richards, made every effort to get after to secure the depth charges, but was unable to do so. Before the ship sank three rafts were lost and another floated off when the destroyer went down. A small motor dory and two other small boats floated clear. The motor boat was seaworthy, but its engine would not run. One of the small boats was damaged, but was of use in getting men on the rafts. The whaleboat was launched, but was useless owing to damage from the explosion.

As the ship settled the commanding officer ran along the deck and ordered everybody to jump overboard. Most of the men who were not killed by the explosion got clear of the ship and reached rafts of wreckage, although a few were seen to be swimming at a considerable distance from the ship, having probably jumped overboard after the torpedo struck the vessel.

Destroyer Sank in Eight Minutes.—Eight minutes after being struck the destroyer sank stern first. About 15 minutes after the ship sank, the submarine came to the surface, approached within a half a mile of the rafts and picked up two survivors, although at the time only one was seen to be taken aboard. The submarine then submerged and was not seen again. Immediately after the sinking the commanding officer, who jumped overboard as the ship sank and was picked up by the motor dory, had efforts made to get all survivors on the rafts and get the rafts and boats together. He then began to make arrangements to reach the nearest land in the motorboat, so as to bring assistance to the survivors on the rafts. Lieutenant Richards received orders to take charge of the survivors and keep the rafts together.

The commanding officer and the navigating officer, Lieutenant Scott, knew accurately the position of the ship when she sank, and also knew the course to the nearest port. They therefore made the trip in the motor dory with four men to assist. All the provisions and medical kit from the motor boat were left with the men in the rafts, except a few emergency rations and half a bucket of water. The boat had to be pulled by oars, as the engine would not run.

After a very trying trip, during which it was necessary to steer by the stars and by the direction of the wind, the boat was picked up at 1 o'clock the next afternoon by a small patrol vessel. The senior officer of the station to which this patrol vessel belonged informed Lieut. Commander Bagley that the other survivors had all been rescued.

One small raft which had been separated from the others from the time of the sinking was picked up by the steamship *Catalina* at 8 p. m. on December 6. The remaining survivors were picked up at 8.50 a. m. on the 7th by a British patrol vessel.

Out of the total of seven officers and 103 men two officers and 64 men were lost. Two of these were captured by the submarine.

Commander Bagley gives unstinted praise to the behavior of officers and men.

Lieutenant Norman Scott, executive officer, accomplished a great deal toward getting boats and rafts in the water, turning off steam from the fire room to the engine room, getting life belts and splinter mats from the bridge into the water, in person firing signal guns, encouraging and assisting the men and, in general, doing everything possible in the short time available. He was of invaluable assistance during the trip in the dory.

Lieutenant J. K. Richards was left in charge of all the rafts, and his coolness and cheerfulness under exceedingly hard conditions were highly commendable, and undoubtedly served to put heart into the men to stand the strain.

Lieutenant Kalk, in the early part of the evening, although already in a weakened condition, swam from one raft to another in the effort to equalize weight on the rafts. The men who were on the rafts with him say that "he was game to the last."

Lieutenant Gates is reported calm and efficient in the performance of duty.

Gave Part of His Clothing to Others.—During the night Charles Charlesworth, boatswain's mate, first class, removed parts of his own clothing, when all realized that their lives depended on keeping warm, to try to keep alive men more thinly clad than himself. Commander Bagley recommends that he be commended for his action.

At the risk of almost certain death Philip J. Burger, seaman, second class, remained in the motor sailboat and endeavored to get it clear for floating from the ship. While he did not succeed in accomplishing this, which undoubtedly would have saved 20 or 30 lives, he stuck to duty until the very last, and is recommended as being most worthy of commendation. He was drawn under the water with the boat, but later came to the surface and was rescued.

L. J. Kelly, chief electrician, and Howard U. Chase, quartermaster, third class, remained on board until the last, endangering their lives thereby, to cut adrift splinter mats and life preservers. Kelly's stamina and spirit were especially valuable during the motor dory's trip.

H. L. Gibson, chief boatswain's mate, and Edward Meier, water tender, were of great assistance to the men on their rafts in advising and cheering them up in most adverse conditions.—*N. Y. Times*, 12/1.

IDENTITY OF TWO SEAMEN, TAKEN BY U-BOAT LEARNED.—The Navy Department has been informed through the Red Cross that the two men of the *Jacob Jones* captured by the German submarine which sank that destroyer on December 6 are Albert De Mello, seaman second class, and John Francis Murphy, ship's cook first class. They are held prisoners in Germany.

De Mello's father, Antonio V. De Mello, resides at 121 Hathaway Street, New Bedford, Mass.

Murphy's name was given as "Marfee" in a previous dispatch and a second inquiry was necessary to establish his identity.

Murphy gave as his next of kin, mother, Mrs. Julia Murphy, 53 Hall Avenue, Newport, R. I.—*Official Bulletin*, 10/1.

NORTH SEA

THE STORY OF H. M. TORPEDO-BOAT DESTROYER "SHARK," IN THE ACTION OFF JUTLAND BANK, MAY 31, 1916.—H. M. S. *Shark*, under the command of Commander Loftus W. Jones, went into action about 4.45 p. m. on the 31st of May with a complement of 91 officers and men. Of that number only six saw the dawn of June 1.

In spite of the soul-shaking experience through which they passed, these six men have remembered sufficient details of the action to enable the following record to be pieced together. Many stirring acts of gallantry and self-sacrifice, and much of interest to the relatives and friends of those who were lost, must inevitably be lacking from this narrative. But the evidence shows such supreme human courage and devotion to duty in the face of death that, incomplete as it is, the story remains one of the most glorious in the annals of the British Navy.

At 2 o'clock in the afternoon of May 31 the *Shark* and three other destroyers, *Acasta*, *Ophelia* and *Christopher* were acting as a submarine screen to the third battle cruiser squadron, with the light cruisers *Chester* and *Canterbury* in company. The force was steaming on a southerly course in advance of the British battle fleet, which was engaged in one of its periodical sweeps of the North Sea.

This advance squadron was under the command of Rear Admiral the Hon. Horace A. L. Hood, C. B., M. V. O., D. S. O., flying his flag in *Invincible*.

The main battle cruiser fleet and the fifth battle squadron were considerably further to the southward, and at 2.20 p. m. the light cruisers

attached to this force signalled by wireless the first intimation that the enemy's fleet was at sea. Subsequent reports confirmed this, and acting on the information contained in these intercepted messages, Rear Admiral Hood ordered the ship's companies to "action stations" and shaped course to intercept the advancing enemy.

At 3.48 p. m. the battle cruiser fleet and the fifth battle squadron engaged the German main fleet and turned north with the object of drawing the enemy towards the British battle fleet. It must be remembered that at this point the enemy was presumably in complete ignorance of the approach of the British main fleet. The weather was hazy, with very little wind and patches of mist that reduced the visibility to an extent that varied from one to eight miles.

At 4.04 p. m. Rear Admiral Hood received orders from Admiral Sir John Jellicoe, Commander-in-Chief, to proceed at full speed with his squadron and reinforce the battle cruiser fleet; the third battle cruiser squadron altered course as necessary and an hour and a half later the first sounds of firing reached them out of the mists ahead.

The first faint intermittent murmur of sound increased momentarily as the two forces converged, and at 5.40 p. m. the haze on the starboard bow was pierced by flashes of gun-fire; a few minutes later a force of German light cruisers and destroyers became visible, heavily engaged with an unseen opponent to the westward.

Fire was immediately opened, and Rear Admiral Hood turned to starboard, bringing the enemy onto the port bow of his squadron. Three light cruisers, a flotilla leader and 10 destroyers were now visible, the latter apparently turning to launch a torpedo attack upon the third battle cruiser squadron. The four destroyers which had hitherto been disposed in two subdivisions, one on each bow of the *Invincible*, were thereupon ordered to attack the enemy. Led by Commander Loftus Jones in *Shark*, the division swung around and hurled itself at the German force, opening fire with every gun that would bear.

In the meanwhile the enemy opened a heavy though ill-directed fire on the battle cruisers. A large proportion of the shots were falling short, and the British destroyers had in consequence to advance through a barrage of fire which surrounded them on all sides with columns of water and bursting shell.

In spite of their numerical superiority the German destroyers turned away in the face of this determined onslaught, and Commander Loftus Jones satisfied that the intended torpedo attack on Rear Admiral Hood's squadron had been frustrated, and having fired two of his three torpedoes, turned 16 points to regain his position on the bow of the *Invincible*. The remaining three destroyers followed in his wake.

Three German battle cruisers had then appeared out of the mist in support of the enemy light cruisers, and the gallant division with *Shark* at their head turned under a concentrated deluge of shells from the entire German force.

A fragment of a projectile struck the *Shark's* wheel, shattering it and wounding the coxswain, Petty Officer Griffin, on the right hand. The captain immediately ordered the after wheel to be manned and followed the coxswain down the ladder to the shell-torn upper deck to con the ship from aft. The yeoman of signals, Petty Officer Banham, who up to this point had been the third occupant of the bridge, hurried after the captain.

The enemy were now using shrapnel, and the captain was wounded in the thigh and face as he reached the bottom of the ladder. He stumbled aft, endeavoring to stanch the flow of blood with his hands, to find on reaching the engine room hatchway that a shell had burst inside the engine room and the main engines and steering gear were completely disabled. The coxswain had been struck at the same time as the captain, and dropped insensible from a wound in the head. The foremost gun, under the command of sub-Lieutenant Vance, had been blown away and only one survivor of its crew lay badly wounded amid the wreckage.

The *Shark* was then lying with disabled engines helpless under a heavy fire, and Lieutenant Commander John O. Barron, who commanded the *Acasta* and had been second in the line, gallantly brought his destroyer between the *Shark* and the enemy's fire and signalled to ask if he could be of any assistance. The captain of the *Shark* was then aft cheering and encouraging the crews of the midship and after guns. The yeoman of signals who remained at his side read the signal and reported it to the captain, who replied, "No. Tell him to look after himself and not get sunk over us."

The yeoman of signals accordingly semaphored Commander Jones' last signal to the division under his orders, and the *Acasta* followed in the wake of the other two boats which were rejoining the battle cruisers.

It is probable that at this juncture Rear Admiral Hood sighted the British battle cruiser fleet, which he had been ordered to reinforce, and proceeded to carry out his orders. The third battle cruiser squadron vanished into the mist and the enemy closed in upon the *Shark*, which lay rolling helplessly in the swell, blazing defiance from her after and midship guns.

The after gun was almost immediately put out of action and its crew killed or wounded. Amid a hail of shrapnel bullets and flying splinters the spare torpedo was hoisted off the rack, and under the directions of the captain, was being launched into the tube, when it was struck by a shell and burst with a violent explosion, causing heavy casualties.

Only one gun, the midship one, now remained in action. The ship was settling down by the bows and every moment she shuddered with the impact of a fresh hit. The riven upper-deck was a shambles, and the dead, mingled with shattered wreckage, were blown hither and thither by the blast of exploding shell. Projectiles, pitching short, flung great columns of water into the air, or passed screaming overhead; the upperworks were riddled by splinters from bursting shells.

One by one the wounded crawled brokenly into the lee of the casings and funnels in pitiful attempts to find shelter; among them knelt the devoted figure of the surgeon, endeavoring single-handed to cope with his gallant hopeless task. When last seen he was bandaging a man who had lost a hand when the torpedo exploded. He was then himself severely wounded and was apparently shortly afterwards killed.

The enemy had then closed in to a range of about 1500 yards; the survivors of the engine room staff had come on deck and the captain ordered the collision mats to be placed over the shot holes and every attempt to be made to plug them and keep the ship afloat. This was accordingly done under the direction of Lieutenant Ernest T. Donnell, the first lieutenant, who appears to have been still unwounded and maintained a cheering spirit of indomitable pluck to the last. The coxswain, who had recovered consciousness, though half blinded by blood from his wound, superintended a party who, under the captain's orders, were turning out the boats and endeavoring to launch the rafts. The boats were smashed by shell-fire while still at the davits, but three rafts—two regulation life-saving rafts and an extemporized affair of four barrels lashed together—were placed in the water.

In the meanwhile the midship gun, under the command of Midshipman T. Smith, R. N. R., maintained a steady fire. The stock of percussion tubes threatened to run short at one time, and the gunner, W. Gale, though severely wounded, crawled down below and brought a fresh supply, shortly after which he was killed. Leading Signalman Hodgetts, who had been previously working as one of the ammunition supply party, was blown overboard by the explosion of a shell; a few minutes later his dripping figure appeared over the rail and he coolly resumed his work. By some curious freak of chance he was again blown overboard by the blast of a shell, but again he clambered back to his place of duty, and his death.

The crew of the midship gun was ultimately reduced to two men, Able Seaman Howell, the gunlayer, and Able Seaman Hope. The midshipman

trained the gun while Hope loaded and Howell fired. The captain stood beside the gun giving them the range, heartening the remnant of the crew by his example of cool courage. Howell, who had been severely wounded eventually dropped from loss of blood, and the captain took his place. A moment later he was himself struck by a shell which took off his right leg above the knee.

He lay on the deck in the rear of the gun while the coxswain and a chief stoker named Hammell between them improvised a tourniquet from a piece of rope and fragment of wood. While they were endeavoring to stop the bleeding, Commander Loftus Jones, in the words of an eyewitness who survived, "Gentleman and Captain as he was" continued to direct the firing of the gun.

In all history the unquenchable Spirit of Man has rarely triumphed so completely over shattered nerves and body. As his strength ebbed Commander Loftus Jones seems to have been overtaken by fear lest the ship should fall into the hands of the enemy, and seeing the German destroyers approaching, he gave orders for the *Shark* to be sunk. A moment later, however, the gun fired another round and apparently realizing that the ship was still capable of further resistance he countermanded the order, adding, "Fight the ship!"

The gaff on the mainmast at which the ensign was flown had been broken by a shot, and the flag hung limp against the mast. The mind of the captain must have turned at the last to that emblem of all he was dying for so gallantly, for presently he asked faintly what had happened to the flag. One of the men tending him replied that it had been shot away, and in great distress he ordered another to be hoisted immediately. Able Seaman Hope accordingly left the gun, and climbing up, detached the ensign and handed it down to Midshipman Smith who bent it on to a fresh pair of halyards and hoisted it at the yard-arm. The captain seeing it once more flying clear said, "That's good," and appeared content.

The end was now drawing very near. The bows of the *Shark* had sunk until the foremost funnel was awash, and the waves were lapping over the water-logged hull. Seeing that two German destroyers had approached to within a few hundred yards with the evident intention of administering the *coup-de-grace*, Commander Loftus Jones gave his last order to the ship's company, "Save yourselves."

He was helped into the water by the coxswain and a number of others who had tended him devotedly after he received his mortal wound, and floated clear of the ship with the support of life-belt. The remainder of the crew to the number of about a score swam towards the rafts and pieces of floating wreckage.

Two torpedoes struck the *Shark* amidships almost simultaneously. With a muffled explosion she lurched violently to starboard, flinging overboard the dead and wounded who still remained on deck. Her stern rose until it was almost perpendicular and she sank with colors flying, about an hour and a half after firing her first shot.

Stoker Petty Officer Filleul and Able Seaman Smith succeeded in placing the captain on the raft of barrels, where they propped him in a sitting position with the aid of life-belts and buoys. While this was being done the captain attempted to smile, and shook his head saying, "It's no good, lads."

Stoker Petty Officer Filleul remained by the captain, and Able Seaman Smith swam to one of the other rafts on which Griffin, Chief Stoker Newcombe, Yeoman of Signals Banham, Stoker the Coxswain, Petty Officer Swan and Able Seamen Hope and Howell had succeeded in crawling. The three rafts drifted within sight of each other through the long northern summer twilight.

Shortly after the *Shark* sank the British battle cruisers swept past in pursuit of the enemy. The captain asked if the pursuing ships were British. Filleul replied that they were, and the captain said, "That's good!"

Not long afterwards his head fell forward and his gallant spirit fled.

The second life-saving raft had been so damaged by shell-fire that only two men could be accommodated upon it. The two most severely wounded (one of them had lost a leg) were helped on to it by a number of others who themselves clung to the edge, among them being the first lieutenant. Able Seaman Smith, on the other raft, realizing that the majority were badly wounded and being himself only slightly hurt, swam over to render what assistance he could. The first lieutenant, who had unfailingly cheered and comforted the stricken little band, presently asked if any could still sing, and then, without faltering, himself began:

"Nearer, My God, to Thee."

Those who had the strength joined in as they clung submerged up to their shoulders in the icy water, almost unrecognizable from the thick black oil which floated on the surface; and so, one by one, death overtook them. Able Seaman Smith alone survived more than a couple of hours.

While it was still light the British battle fleet was sighted through the mists, and the drenched, haggard figures on the other raft cheered it as it passed five miles away. With indomitable optimism they all clung to the hope of a speedy rescue, and Able Seaman Howell semaphored across the waste of water, "We are British," in the hope that it would be read by one of the distant ships.

The twilight deepened into dusk and the raft on which Able Seaman Smith alone survived was lost to sight. The six occupants of the other sat with the waves washing over them, nursing their wounds and debating the prospects of being picked up. The yeoman of signals rambled into delirium at times and finally said, "I must have a sleep. Let me get my head down."

Able Seaman Hope attempted to dissuade him but without avail. "I must sleep," he insisted pathetically, and as he stretched himself in the bottom of the raft the ruling instinct of the service came back through the mists of death. "Give us a shake if the captain wants anything," he said, and his loyal spirit passed to join that of his captain.

Shortly before midnight the distant lights of a steamer were sighted. Able Seaman Howell then remembered for the first time that he had fastened a Holmes' light with wire on one of the rafts a few days previously. Steadying himself with difficulty on the pitching raft he fumbled along the edge and presently found the little tin cylinder that was to prove their salvation. With the last remnants of his failing strength he wrenched the nipple off, and the carbide, ignited with the water that washed over them, burnt with a bright flare. They waved it frantically and tried to shout; but the flare was seen and presently out of the darkness loomed the hull of the Danish S. S. *Vidar*. Her captain brought the ship alongside the raft, and one of her boats, which had already picked up Able Seaman Smith off his raft, presently rejoined them.

All survivors have testified to the high courage of Able Seaman Hope. Throughout the whole ordeal his plucky personality came constantly to the fore, and he alone retained strength to climb on board the *Vidar* unaided. On reaching the upper deck he refused to go below or receive any attention until the remainder of his shipmates had been hoisted on board.

The *Vidar* cruised in the vicinity for upwards of two hours in the hope of picking up further survivors, and Stoker Petty Officer Filleul was seen floating on the water and rescued as he was losing consciousness. No further traces of the *Shark's* crew were found, however, and the *Vidar* shaped course for Hull. On the passage Chief Stoker Newcombe, who had been wounded at the commencement of the action, succumbed to exhaustion in spite of every endeavor to save his life.

His Majesty the King, in recognition of the valor of the captain, officers, and men of the *Shark*, granted Commander Loftus W. Jones, the only posthumous honor that can be awarded in either service, the Victoria Cross. The six survivors, each of whom had played his part with the utmost gallantry, were decorated with the Distinguished Service Medal.

A few weeks after the action the fishermen of the little village of Fiskebackskie, on the coast of Sweden, found washed ashore the body of Commander W. Loftus Jones, V. C. It was buried in the village church yard on the 24th of June, with every token of sympathy and reverence.—*Navy and Merchant Marine*, December.

THE WAR AT SEA.—By a British Naval Officer.—The Admiralty made a further announcement on the subject of the action in the Heligoland Bight on Saturday, November 17. It will be remembered that in the announcement made earlier it was stated that the Admiralty were yet without detailed information as to the operation. In the further *communiqué* and that issued by the Germans on the same day it was revealed that the British force which engaged the enemy was an advanced body which actually pursued the enemy through his own minefields. This advanced force only broke off the engagement and turned back to meet its supports outside the minefields when four enemy battleships and battle cruisers were sighted. That the affair did not attain larger proportions was due to the fact that the British supporting force found the area within the minefields too restricted to maneuver in, and the enemy were too cautious to venture outside the minefield. It was suggested in these columns that this affair, like others of a similar nature which had previously occurred, was more or less accidental—that is to say, it did not arise from a concerted operation against the Germans, such as the action which the Admiralty reported to have had both “fortunate and fruitful” results in September, 1914. It was regarded, in fact, as a casual encounter brought about by the vigilance and energetic action of the British patrols rather than what was officially described three years ago as “a sweeping movement,” designed “to cut the German light craft from home and engage them at leisure” in the open sea. Sir Cyprian Bridge, in an article in the *Sunday Times*, appears to take this view also, since he says that scraps of the character of that of November 17 “tend to test not only the efficiency of the lookout kept by the navy, but also its quality when suddenly confronted with an enemy force.” The British patrols are not engaged in cruising about the North Sea aimlessly, but there must be many, many days and nights when they are “on the spot” to no purpose, and, considering the vast expanse of water to be covered, it can surprise no one if it is only at comparatively long intervals that a hostile collision actually takes place.

This action in the Bight should serve as a reminder to the public of the entirely changed condition in those waters since the scooping action was put in execution a little more than three years ago. There is not a word in the official *communiqué* of that time of danger to be expected from the minefields of the locality where the engagement took place. Indeed, it was only from the reports of the submarines that it was known there were minefields there at all, and these were probably of small dimensions. Matters are very different to-day, and without a large force of mine sweepers and their covering vessels it may be questioned whether what Admiral A. H. Christian described in his report of the affair of August 28 as “a reconnaissance in force” could be carried out. Naturally, however, if our patrols in their cruises along the outer edge of the German minefield should chance to sight a detachment of the enemy they would most certainly endeavor to engage it and, if possible, prevent it from returning to safety. This is clearly what happened on this occasion, and it was possible to continue the chase through the minefields because the flying enemy showed the way. Sir Cyprian Bridge, in the article already referred to, suggests as a reason for the enemy being sometimes found outside his fixed defences, that the German naval authorities having said that they can send their men-of-war to sea, find it necessary to give occasional proof that this is really done. There may, however, be other reasons. It will have been noticed that the enemy detachments sighted by our patrols usually include minesweepers, and it may be conjectured, therefore, that the enemy when

contemplating a raid or "an enterprise directed northward," find it expedient to insure that a passage exists for the force they desire to employ. It is not easy to believe that the German naval authorities hold it necessary to risk their ships merely to make good the boastful assertions with which they gratify their people. Even the misleading messages in which, by wireless, they announce an engagement when it does come off cannot disguise the fact that their main fleet refuses to accept action and its small craft are driven to take shelter. In August, 1914, the *Cologne Gazette*, in what was evidently an inspired article, said: "Great Britain calculates on the German fleet, on account of its fighting courage, being tempted to risk itself in a foolhardy manner. But the German naval authorities will not fulfil the British expectation." The German naval authorities never have had any idea of sending out the High Sea fleet to sea to try conclusions with ours in a general action, and, after Jutland confirmed their apprehensions of what might happen, they never will.

The announcement of the German Government that it has extended its "barred zone" is on a par with other declarations of "frightfulness." It is intended, according to the *Berliner Tageblatt*, to facilitate the task of the submarine, but exactly how it is to do so the German newspapers do not explain. The official notice states that the widening of the zone consists chiefly of an extension to the westward of the danger area which encircles this country, but there have been no signs up to the present that the submarines have put any limit to their activities in this direction. This may be said also of the new barred zone to be created around the Azores. Possibly they may now have a greater number of the larger submarines which are enabled by their size to exercise a more extended mobility, but by this time the Allies are not without means for meeting the threat of the heavier boats, as they have met that of their lighter consorts. The closing of the alleged free channel to Greece has already been anticipated, and it may be concluded that the official notice is deemed by the German authorities to be a concession to the feelings of their friends in that country. Like the notice about the respite to neutral ships and ships of the Belgian Relief Committee, any seeming concession which the Germans may make is not likely to have more value than that made on any other scrap of paper. In all probability, the true inwardness of this notice lies in the fact that the enemy are once more about to attempt a campaign of the utmost intensiveness. It may be deemed a warning that they are again about to put forth their full strength with every available submarine. It may show also that this attempt will be carried out further into the Atlantic, with the result, of course, that the crews of the ships which fall a victim to it will stand a poor chance of reaching land in their boats, even if they are not accorded the inhuman treatment expressed in the policy "sink without a trace."—*Army and Navy Gazette*, 14/12.

BRITAIN SHOCKED BY NAVAL REVERSE.—The successful attack by German warships on a convoy in the North Sea resulting in the sinking of 14 vessels, as announced in the House of Commons December 17, came as an uncomfortable surprise to the British public. It is expected to cause a revival of the serious criticism of the Admiralty such as at the time of the successful German attack on a convoy of Scandinavian merchantmen in October.

Added to this is the raid made off the Tyne last Wednesday by German warships. As a result of these two expeditions one British destroyer has been sunk, another seriously damaged, five trawlers and eight merchantmen have been sent to the bottom, another trawler has been damaged and a number of men have been killed, wounded or taken prisoner. Among the prisoners is a nephew of Viscount Grey, former foreign secretary.

According to the Danish accounts, the force which attacked the convoy consisted of four cruisers, in addition to destroyers. A painful aspect of the affair, from the British public's point of view, is that apparently all the

attacking vessels escaped and returned to their bases. Another unpleasant feature is that the British cruiser squadron detailed to protect the convoy against surface attacks for some unexplained reason was not on the scene. Vice Admiral Beatty immediately opened an inquiry, and the first sitting was held December 23, being conducted by Vice Admirals Sturdee, de Robeck and Goodenough. The investigation will be hastened as much as possible.

According to the testimony of survivors both here and in Scandinavia, the fighting was of most violent character. The Germans poured hundreds of shots into the ill-fated vessels.

Testimony given at the inquest over the victims of the German attack on the British convoy shows that the attack occurred between 4 and 5 o'clock on the morning of December 12 and that the enemy destroyers fired as rapidly as possible for a few minutes. A Swedish steamer was torpedoed twice, the second torpedo cutting the vessel completely in two. Of the crew of 20 hands on board it 16 were either killed or are missing.

No assistance was rendered by the enemy boats. British destroyers came upon the scene and rescued the survivors.

The merchant vessels were being convoyed by the destroyers *Partridge* and *Pelew*. The *Partridge* was sunk and the *Pelew* was damaged.

Sir Eric Geddes said the circumstances of the attack, so far as available, were that the *Partridge* sighted four enemy destroyers shortly before noon, and, with the *Pelew*, engaged them, while the convoy scattered. The *Partridge* was hit heavily. Shortly afterward an explosion occurred aboard and she sank. The *Pelew* was pierced at the water line and her engines were disabled, but eventually she was brought safely to port. The enemy then attacked the convoy sinking the merchantmen and armed trawlers.

The entire crew of the trawler *Lord Alveston* was saved in one of its own boats. The casualties on the *Pelew* were one officer and three men killed and two wounded seriously. Information regarding the crew of the *Partridge*, Sir Eric said, was incomplete, but a report from Kiel told of the taking there of three officers and 21 men from the *Partridge* and of one officer and 25 men from the trawlers.

Eighty-eight Scandinavians, two of whom are women, and 10 British were rescued by four British destroyers detached from a cruiser squadron which was hastened to the scene. Other survivors reached Norway in boats.

German Official Report.—The following official communication was issued December 14, dealing with German naval attacks on commercial traffic off the east coast of England and in the North Sea last Wednesday:

"Simultaneously with an attack on commercial traffic on the English east coast our light forces on December 12 under command of Lieut. Captain Hans Kolbe, again attacked a convoy.

"The convoy consisting of six steamers totaling 8000 tons, including an armed English steamer, the torpedo-boat destroyer *Partridge* and four armed vessels, were destroyed in battle. The English destroyer *Pelew* escaped damaged.

"Our forces returned without losses and with a large number of prisoners, including four officers."—*Washington Star*, 18/12.

NOBODY TO BLAME FOR CONVOY DISASTER.—In the House of Commons today Sir Eric Geddes, First Lord of the Admiralty, made this statement concerning the attack by German warships on a convoy in the North Sea December 12, in which one British and five neutral merchantmen, a British torpedo-boat destroyer, and four armed trawlers were sunk:

"The Admiralty finds that the escorting vessels did their best to protect the convoy and were fought in a proper and seamanlike manner, and that other forces at sea for the purpose of protecting took all possible steps to come to their assistance and prevent the escape of the enemy.

"It is due to Vice Admiral Sir David Beatty, commander of the Grand fleet, to say that the Admiralty finds the circumstances which prevented covering forces from behind reaching the spot were such as could not be prevented and that the commander-in-chief's dispositions were the best that could have been made with the forces available."—*N. Y. Times*, 15/1.

ARMED BRITISH SHIP SUNK BY SUBMARINE.—The British armed steamship *Stephen Furness* has been torpedoed and sunk by a German submarine in the Irish Channel, it was officially announced December 22. Six officers and 95 men were lost.

The *Stephen Furness* was a merchantman of 1712 tons gross, built in 1910 at West Hartlepool, and owned by the Tyne Tees Shipping Company, Ltd., of Newcastle. She was one of the many merchantmen that have been refitted by the Admiralty for naval uses.—*N. Y. Herald*, 23/12.

"U-53" CAPTURED.—The *U-53*, the German submarine which visited Newport over a year ago and then sank several ships off Nantucket, has been captured by the French.

The *U-boat* was taken by a French destroyer and two minesweepers. The big submersible is now in allied service and has accounted for several enemy submarines, which, recognizing her lines as Hamburg-built, approach her without fear, as the *U-53* usually runs awash.—*Baltimore News*, 28/12.

ZEPPELIN DROPS INTO SEA.—A Zeppelin and a seaplane which was accompanying it have been wrecked in the North Sea, according to a *Central News* dispatch from Copenhagen, quoting advices received there from West Jutland.

The Zeppelin is said to have fallen in flames to the sea.—*Washington Post*, 30/12.

THREE BRITISH SHIPS LOST.—Three British torpedo-boat destroyers were sunk through being struck by torpedoes or hitting mines off the Dutch coast on the night of December 22, with the loss of 13 officers and 180 men, the Admiralty announced December 29. The text of the statement reads:

"Three of our destroyers were mined or torpedoed during foggy weather off the Dutch coast on the night of the 22d of December. A total of 13 officers and 180 men were lost."

Whether correctly or not, the supersession of Admiral Sir John Jellicoe as First Sea Lord is popularly believed to have been the direct sequel of the loss of the three destroyers. This incident has been generally known here, although only just announced officially.

The First Lord of the Admiralty, Sir Eric Geddes, went several days ago to Sandringham, where the royal family is staying for the holidays. He was received in audience by the King on Christmas, which indicated that the business was unusually urgent. The Admiralty changes were announced the next day.—*N. Y. Times*, 30/12.

BRITISH DESTROYER LOST WITH ALL HANDS.—The British destroyer *Racoon* struck rocks off the Irish coast on Wednesday and foundered, it is announced officially. All on board were lost. The text of the statement issued by the Admiralty says:

H. M. S. *Racoon*, Lieutenant George Napier in command, struck on the rocks off the north coast of Ireland at two o'clock in the morning during a snowstorm, and subsequently foundered with all hands.

Nine of the crew had been left behind at her last port of call, and these are the sole survivors. Seventeen bodies have been picked up by patrol craft and are being buried at Rathmullen. Five more bodies were washed ashore, and they are being buried locally.

The *Racoon* was built in 1910. She was 266 feet long and displaced 915 tons. She was armed with one 4-inch and three 3-inch guns, and two torpedo tubes. Her normal complement was 105 men.—*N. Y. Times*, 13/1.

BRITISH LOSE TWO DESTROYERS IN GALE.—The British Admiralty announces the loss of two torpedo-boat destroyers in a violent gale and a heavy snowstorm last Saturday night. The vessels ran ashore on the Scotch coast and were wrecked and all hands on board were lost, except one man.—*N. Y. Herald*, 18/1.

FRENCH MERCHANT SHIP FIGHTS.—An inquiry was made into the conditions in which encounters have taken place between French merchantmen and enemy submarines between January 1 and August 1, 1917. It is stated that the French ships were successful in 106 of these encounters. In 34 cases success was due to maneuvering, and in 62 to the use of artillery. In 13 cases it was not the submarine which began the fight. There were even occasions when merchant vessels chased their enemy. In three cases the French vessels escaped by beaching. On June 5 the French steamship *Diane* was sunk by an enemy submarine in the English Channel.—*Journal United Service Institute*, November.

HOSPITAL SHIP TORPEDOED; ALL OF WOUNDED SAVED; THREE SAILORS MISSING.—The hospital ship *Rewa* was torpedoed and sunk in the Bristol Channel on January 4, while on her way from Gibraltar, it is announced officially.

All the wounded were rescued.

There were three casualties among the crew.

"His Majesty's hospital ship *Rewa* was torpedoed and sunk in the Bristol Channel at about midnight on January 4 on her way home from Gibraltar. All the wounded were safely transferred to patrol vessels. There were only three casualties among the crew, three Lascars being missing.

"She was displaying all the lights and markings required by The Hague convention. She was not and had not been within the so-called barred zone, as delimited in the statement issued by the German Government on January 19, 1917."

After making several charges of the misuse of hospital ships, which were denied specifically by the Entente Governments concerned, the Germans last year suspended the immunity of these vessels in the English Channel and certain other waters.

The British discontinued special markings of hospital ships, on the ground that they were merely rendered conspicuous thereby and were more liable to attack. Last September King Alfonso of Spain intervened and succeeded in obtaining an agreement from the belligerents for the free movement of hospital ships within specified areas.

The British steamship *Rewa* is of 7308 tons gross and 456 feet long. She was built in 1906 and owned in Glasgow and has been in the service of the British Government.

The Bristol Channel is an arm of the Atlantic extending into the southwestern part of Great Britain between Wales and the southwestern counties of England.—*Baltimore News*, 9/1.

AN INTERESTING PRECEDENT.—German denials of the torpedoing of the hospital ship *Rewa* serve as a reminder of that famous *Sussex* denial, fortified by the submarine commander's drawing. Only last week Germany agreed to pay a large sum of money by way of indemnity to the family of a Spaniard who lost his life on the torpedoed *Sussex*. That was an interesting admission of Germany's guilt.—*N. Y. Herald*, 14/1.

A GERMAN WARSHIP BOMBARDS YARMOUTH.—Yarmouth was bombarded from the sea last night, it is announced officially; about 20 shells fell in the

city. Three persons were killed and 10 injured. The enemy craft presumably was a submarine or a light cruiser. The bombardment, which was preceded by illumination of the town by large star shells, continued about eight minutes. The inhabitants were taken completely by surprise.

Owing to the blackness of the night the enemy was not seen. He fired 20 to 25 shells in rapid succession. Many windows were shattered and a number of roofs and chimneys were wrecked.

Most of the inhabitants were in bed at the time of the attack. One of the three persons killed was a sailor aboard ship, who had escaped submarines in midocean. The other two were killed in the street. There were many narrow escapes among the occupants of the damaged houses.

Attacks by German naval forces on English coast towns, of which there were a number early in the war, have been infrequent in recent months. The last previous occurrence of the kind officially reported was on September 4 of last year. On that day a German submarine bombarded Scarborough, causing the death of three persons and the injury of five.

Yarmouth is on the North Sea 115 miles northeast of London. It is a city of some 50,000 inhabitants, with important shipbuilding and fishing industries.—*Baltimore American*, 16/1.

BALTIC

TWO HUNDRED AEROPLANES WOULD HAVE ENABLED THE RUSSIANS TO CHECK THE GERMANS AND PREVENT CAPTURE OF STRATEGICAL BASES IN THE GULF OF RIGA.—Once more Russia has suffered defeat through her lack of aircraft. In 1914-1915 Russia suffered great losses because she did not have a hundred or so additional air scouts to direct the movements of the Russian forces and warn them of the movements of the Germans.

Russia's recent losses and her inability to check the Germans in the naval operations which resulted in the Germans capturing the important Islands of Dago and Oesel and resulted in the loss of the large Russian dreadnought *Slava* was due more than anything else to the lack of 200 additional fighting aeroplanes with which to defeat the German Zeppelins and aeroplanes which directed the operations of the German forces.

Had they been able to maintain their aerial supremacy, the Russians could have prevented the blockade of the Gulf of Riga and Moon Sound and the landing of troops on the Dago, Oesel, Runo and Moon islands, which resulted in the capture of 10,000 Russian troops and 50 cannons.

It was known that the Russians had only a handful of aviators to protect the group of Baltic Islands which lies between the Gulf of Finland and the Gulf of Riga, off the Esthonian coast. That they fought the German aerial forces was shown by the reports which stated that two German aviators were shot down.

The aerial engagements between the German and Russian aerial forces preceded the naval engagement. It took place on the northern coast of the Island of Dago, to which the Germans came from the open sea. Having disposed of the few Russian aviators, the German naval forces could operate unhindered, using their Zeppelins and aeroplanes to direct their ships which located the entrance to the Moon Sound, protecting the ships from British and Russian submarine attacks. The blockade of the entrance to the Moon Sound between Dago Island and Oesel Island, which was supposed to be well fortified, seems to have taken effect without any fighting.

The next step of the Germans was to force the entrance to the Gulf of Riga to the south of the Oesel Island. Ever since the Germans captured Libau, the important Russian naval base on the Baltic, it was obvious that their next step would be to attempt the forcing of the entrance to the Gulf of Riga. The Russians are known to have mined the entrance to the Gulf and to have blocked it by dumping into it every available material. But the Germans seem to have succeeded in sweeping the mines and clearing the channel.

There were no engagements at the entrance of the Gulf. The Russian fleet moved to Moon Sound, the plan being to seek protection in the Gulf of Finland. The German fleet checked it and during the engagement the Russian ship the *Slava* was sunk at the southern entrance of the Moon Sound, the German guns outranking the Russian guns and four German seaplanes participating in the attack.

The Germans seemed to feel sure that they had bottled up the Russian fleet and proceeded to bombard the islands and to land troops on the Oesel and Dago islands. On October 15 they captured Arensburg, the main city of Oesel Island, and isolated a Russian force in the extreme south of the island. The escape of the Russian fleet seems to have been made possible by the laxity of the German air forces at night.

The German operations from the start were directed by Zeppelins and aeroplanes. It was an easy task because the area of danger from Russian and British submarines was small, extending only to the entrance of the Gulf of Finland and the entrance between the Oesel Island and the mainland. It is evident from the fact that the Germans landed their troops on the Karsar Bay side and from the Gulf side of the Oesel Island that they expected submarine attacks. Therefore, they selected as a landing place for the troops the places which could best be protected from the Russian and English submarines.

One hundred fast fight planes and 100 large torpedoplanes and bombing aeroplanes could have protected these important Russian positions better than their many cannons and warships. The fast fighting machines would have kept the sky clear of German aeroplanes and the torpedoplanes and the bomb dropping machines could have inflicted tremendous damage on the German fleet, sunk the transports and torpedo-boats and damaged even the largest ships. At all events, they could have prevented the carrying out of operations by their continuous attacks on them.

There is little doubt that the best thing that the United States and the Allies can do to help Russia is to supply her with aeroplanes and aviators in large number, and to begin to conduct aerial operations against German military and naval bases from the Russian side, thereby keeping tens of thousands of Germans busy protecting their bases on the Russian fronts, and preventing the concentration of their forces elsewhere.—*Aviation*.

THIRTY-EIGHT OFFICERS SLAIN IN U-BOAT MUTINY.—A mutiny among submarine crews at the German naval base of Kiel, on January 7, is reported in an Exchange Telegraph dispatch from Geneva. Thirty-eight officers are said to have been killed.

The Geneva dispatch quotes advices received there from Basel, giving details concerning the mutiny. It is said to have been begun by submarine crews, and subsequently to have spread to portions of the crews of cruisers stationed at Kiel.

Some of the men who joined in the attack on the officers took part in the earlier mutiny at Kiel, the dispatch reports. It adds:

"Although the mutiny was local, it shows that German naval men are dissatisfied, especially in the submarine service, as the number of boats returning to German ports is decreasing every month."—*Evening Star*, 17/1.

MEDITERRANEAN

SUBMARINE IS SUNK FOLLOWING ATTACK.—A statement by the Ministry of Marine concerning the sinking of the old French cruiser *Chateau Renault* says that the warship, with several other vessels, was attacked by a submarine in the Ionian Sea at 7.15 o'clock on the morning of December 14. Continuing, the statement says:

"The torpedo struck on the starboard side in the region of the stokehold, which it flooded, and at the same time bursting steam pipes which stopped the engines.

"The captain at once manned the hand steering gear and steered so as to utilize the momentum of the ship and approach the shore, which was in sight. Passengers and the crew were ordered to their boat stations at the sound of the explosion. Torpedo-boat destroyers, which formed a part of the convoy, dashed in the direction from which the torpedo had come and volleyed shells at the spot where it was presumed the submarine had submerged.

"While the boats were being lowered from the *Chateau Renault*, the enemy submarine came up on her left. The cruiser had sunk to her gun ports, but nevertheless the gun crews remained at their posts and opened a hot fire on the submarine, which promptly dived. A second torpedo was fired shortly after and struck the *Chateau Renault* on the starboard side forward. She sank by the head a few minutes after the captain got aboard a patrol boat. All passengers were saved, but 10 members of the crew are missing and are supposed to have been killed by the explosion.

"The torpedo-boat destroyers, overloaded with survivors, renewed the attack on the submarine under water and then on the surface when she appeared for an instant, only to submerge again precipitately under fire of the guns of the destroyers. Two seaplanes then bombed her. The submarine probably had been struck by a shell so as to make it impossible for her to remain submerged, for she appeared once again and was immediately covered by a rain of shells.

"One of her gunners was swept overboard by a shell while in the act of aiming his piece, and all the others jumped into the sea, while the submarine sank like a stone torn to pieces by French guns. The prisoners number 22, among them the captain of the submarine and two officers."

The French cruiser *Chateau Renault* was laid down in 1896. She was 442 feet long, with a beam of 55.7 feet and displaced 7898 tons. Her complement before the war was 600 men. Besides being used as a cruiser formerly, the *Chateau Renault* had been fitted as a mine-layer.—*Washington Star*, 23/12.

AMERICAN SHIP "SURAGA" HIT BY TORPEDO.—The American steamship *Suraga*, a vessel of 4374 tons gross register, and owned by the New York and Oriental Steamship Company, was torpedoed and compelled to run ashore on December 27, while in Mediterranean waters, according to a report received in New York, January 8, in insurance circles.

The *Suraga* left New York the latter part of October for an Italian port and it is understood that she was returning and bound for a French port when torpedoed. So far as can be learned all of her crew are safe.—*Washington Star*, 5/1.

JAPANESE SAVE CONVOY.—*Warships Drive off Hostile U-boats in the Mediterranean.*—Enemy submarines which attempted to attack British transports convoyed by Japanese warships in the Mediterranean on December 30 were repulsed, says an announcement from the Japanese admiralty.

The warships were not damaged.—*Washington Post*, 6/1.

BRITISH DESTROYER TORPEDOED.—London, January 7.—A British torpedo-boat destroyer has been torpedoed and sunk in the Mediterranean Sea, according to an Admiralty announcement.

All the officers of the destroyer were saved, but 10 members of the crew were lost.—*Baltimore American*, 9/1.

ITALIAN SHIP SUNK.—*Practically New Steamer Torpedoed by U-boat.*—The big Italian steamship *Milazzo*, 11,477 tons gross register, was sunk during the early part of December by a German submarine while the ship was in Mediterranean waters, according to word received in New York shipping circles January 10. It is understood no lives were lost.

The vessel was practically new, having been launched in 1916, and while originally intended for passenger as well as freight traffic, was employed entirely for freight. She was owned by the Navigazione Generale Italiana, and was last reported in American waters the latter part of September, 1916. At that time she arrived with a damaged propeller, which was caused, it was understood, by an encounter with a U-boat. On her return voyage with a cargo of cotton she caught fire and had to put into Fayal. The fire was extinguished, and after a delay of about two weeks she proceeded on her voyage. The *Milazzo* was 492 feet long with a beam of 65 feet.—*Baltimore American*, 10/1.

ADRIATIC

THE WAR IN THE ADRIATIC.—By a British Naval Officer.—In the Adriatic where, from the beginning of the war, there has been naval co-operation of a very marked kind, the allied fleets have been performing some fine work in connection with the defence of the Piave line. The British monitors, which had been affording the Italians valuable assistance in their advance towards Trieste, are now rendering help in the great struggle against the Austro-German invasion. General Diaz, in an order of the day of November 21, referred to the valuable co-operation of the National Navy and the British monitors in the coastal zone. In a semi-official note also reference was made to the work accomplished by the navies of the allied powers when the right wing of the Italian Army was falling back. Much precious war material was saved, and when the enemy torpedo-craft appeared on the scene they were at once driven off with loss. It was, indeed, suggested at one time that, hoping to take advantage of the situation, the Austrian fleet was putting to sea, but this was denied afterwards, and was, indeed, unlikely, in view of the overwhelming superiority in naval strength of the Allies in the Adriatic. Among the unfortunate results of the occurrences on land may be counted the withdrawal of the threat to Pola given by the advance of the Italians, and which it was anticipated and hoped might force the Austro-Hungarian fleet to leave port. There can, of course, be no question that the loss of Monfalcone and the menace to Venice has deprived the Italians of useful naval bases in the Upper Adriatic, and at the same time has encouraged the Austrian seamen to attempt enterprises which were previously quite beyond their power. It is some time since any attempt on the Italian coast railway has been undertaken, and when a squadron of light craft made their appearance between Porto Corsini and Pesaro towards the end of last month the reception they received from the naval armored trains on the railway forced them to retire. An excellent description of these armored trains with the Italians, with illustrations, was given in Chapter CLXXXIX of the "*Times* History and Encyclopædia of the War." They are an adjunct of the navy which appears to have most adequately fulfilled its purpose. The last report concerning allied naval activity at the mouth of the Piave River was most encouraging. In an official *communiqué* it was stated that on the coastal area a British monitor obtained a direct hit on and interrupted a bridge of boats which the enemy had thrown across the river in the vicinity of Passarella, some 10 miles from the sea. Almost daily, said the military critic of the *Corriere della Serra*, the pontoon bridges which span the river in the neighborhood of Passarella are destroyed by the guns of the British monitors, but the enemy reconstructs them during the night. Mr. G. Ward Price, the correspondent of the *Times*, writing from Venice, mentions the monitor which destroyed the bridge at a range of 18,000 yards as the *Picton*, appropriately named after a British general. He says that at this range there were three bridges across the river 200 yards apart, and on these the monitor's guns put five direct hits out of seven shots. The first shot was on the target, and the pontoon bridges were each hit at either end, one of them being so effectively cut in two that the aeroplane observer reported that the middle

part of it floated away down stream. Another shell was dropped right into the third bridge, an old one made of stone, which the Austrians had repaired. This is a well-deserved tribute to the fine shooting of the bluejackets in the monitor, and also to the spotting of the observer in the aeroplane.—*Army and Navy Gazette*, 8/12.

ITALIANS ENTER TRIESTE HARBOR IN DARING RAID.—Two Italian torpedo-boats, under Lieutenant Commander Rizzo, composed the force which made the daring raid into the inner harbor at Trieste on Sunday night, December 9, and torpedoed two Austrian battleships, one of which was seen to sink. Further details of the exploit were received in dispatches by the Italian Embassy.

The raid was arranged when it was learned that the Austrians were preparing to send from Trieste two vessels of the *Monarch* type, with their 240-millimeter guns, to bombard the Italian coastal positions. A division of torpedo-boats, under Captain Pignatti, was assigned to the task, and the captain selected Lieutenant Commander Rizzo with two boats to make the dash into the harbor, while the remainder of the division kept outside in support.

By slow and silent movement through a heavy fog the little craft reached the extremity of the Muggia Pier, where the officers examined the disposition of the numerous obstructions which barred the passage. Mine fields and other obstructions were located, and two hours were spent cutting eight large wire cables stretched across the passage. Other obstructions were weighted and sunk sufficiently to permit the boats to pass over them.

During all this time Austrian outposts were very near and searchlights were being played on the water, but in spite of this the torpedo-boats succeeded in entering the inner port without being sighted.

Two Austrian battleships were discovered at anchor at the further end of the harbor near Point Sabba. Proceeding cautiously, the Italian vessels approached to ascertain whether there were any protecting nets or other obstructions, then took up positions for the attack.

Finally at half-past two in the morning of December 10 the two torpedo-boats simultaneously launched four torpedoes aimed at the battleships. All four torpedoes exploded. Rizzo reported that the battleship *Wien*, nearest the attacking vessels, was observed to sink in five minutes, while the other battleship certainly was struck, though owing to the great distance it was impossible to discover the damage done.

At the sound of the explosions Austrian batteries opened fire and searchlights swept over the waters. The lights located the attacking vessels and the Austrian guns were brought to bear on them and torpedoes fired, but the Italians escaped and returned safely to base with the supporting squadron.—*N. Y. Herald*, 18/12.

CZECHS GAVE UP WARSHIP.—The Slav Press Bureau makes public a dispatch from Geneva which says:

"The *Pesti Hirlap* of November 21 publishes a number of sensational revelations that were made in the Hungarian Parliament by the Magyar Deputy, Mr. Fenyes. Among these is an interpellation which is addressed to the Hungarian Cabinet in regard to the fate of the Austrian torpedo-boat No. 11, whose personnel consisted of Austrian officers and Czech marines. Deputy Fenyes said: 'Before the Italian offensive the boat left the harbor of Cattaro in order to meet an incoming German submarine and convoy it through the minefields into the harbor. The torpedo-boat never reached its place of destination, however, and the German submarine waited in vain. For two weeks nothing was heard of the whereabouts of this torpedo-boat until the publication of a report by the Stefani Agency stating that it arrived safely in the Italian harbor of Brindisi. The report further stated that while they were on the way to meet the incoming submarine the Czech marines on board the vessel revolted, fettered their Ger-

man and Magyar officers, and steered the torpedo-boat into the Italian harbor.

"This report is another evidence of the fact that the Czechoslovaks are determined to shake off the tyrannous yoke of the House of Hapsburg, and that they will not desist in their opposition until complete independence is secured."—*N. Y. Times*, 30/12.

BLACK SEA

In the Black Sea our torpedo-boats *Pylkyi* and *Bystryi*, dispatched under the command of Captain Count Keller to destroy the Turkish steamer damaged by one of our submarines, discovered an enemy torpedo-boat and two steamers in Inda Bay. The enemy torpedo-boat was sunk and the two steamers were burnt.—*United Service Gazette*.

BRITISH BATTLEPLANE'S 2000-MILE FLIGHT TO BOMB CONSTANTINOPLE.—For the first time the amazing story of a British battle-aeroplane's flight to Constantinople from London, and its sequel in the bombardment of the German headquarters and the Turkish war office there, was told yesterday by Mr. Handley Page, and Mr. Basil Johnson, whose firm, the Rolls-Royce, Ltd., built the engines that flew the 2000 miles without a hitch.

Loading up at Hendon, the machine which with spares and luggage was more than six tons in weight, proceeded to Paris, Lyons, and to avoid the Alps, continued by way of Marseilles. From Marseilles the journey was by way of Spezzia to Risa, Rome, Naples and Otranto, which was the last point over friendly country. The next, and perhaps the most difficult stage of the journey, was over the Albanian Alps to Saloniki, a trip of 250 miles across mountains varying from 8000 to 10,000 feet, with no suitable place for landing in case of need.

Squadron Commander Savory, who was the chief pilot, told him, said Mr. Handley Page, that they could see wild Bulgarian horsemen below, who were running about in every direction, waiting for a chance to kill them if they came down.

From Saloniki the adventurous party flew to their base, overhauled the machine, and prepared for a long distance bombing expedition to Constantinople, a distance of about 320 miles.

On their attacking trip they set forth with 16 bombs, and on arriving at the Sea of Marmora throttled down from 2000 feet to 1600 feet, the Golden Horn and other points being clearly in view.

After a short survey of the lights of Constantinople, and in order to make sure of their objectives, they came down to 800 feet and dropped a salvo of four bombs, hoping to reach the *Goeben*, which was anchored just beneath them. Unfortunately they missed the vessel, but managed to hit one or two submarines that were lying alongside her.

Turning on their track they made another attempt on the *Goeben*, and this time, in spite of the attentions of a number of Turkish and German anti-aircraft guns, managed to plank four bombs on the battleship.

Then they flew up to a ship called the *General*, which was the headquarters of the German staff, and dropped two bombs on her, to the great consternation of naval and military officers assembled in her saloons.

One more target, too tempting to be missed, attracted the intrepid aviators, and they next made their way to that part of the town where the Turkish War Office was situated, and dropped two more of their bombs on the building. The Turkish official report on the latter incident quaintly minimized matters by saying "The war office was not destroyed."

After half an hour's bombing of Constantinople they turned around and started back to their base, Flight Commander McLellan relieving his chief in the steering. They had not escaped without damage, but even after one engine had been put out of action they were able to get away without serious damage from the "band accompaniment" of guns below, which had paid them a quite uncomfortable amount of attention.

On arriving back at the base no fewer than 26 bullet holes were found in the machine. The journey to Constantinople and back (640 miles) occupied seven hours.

Handley Page said Engineer Lieutenant Rawlings, who was one of the party, reported that they had no trouble at all with the engines, although the water in the radiator boiled as on a very hot day. He thought the flight, which constituted a world record for British aeroplanes, engines and aviators, showed the great possibilities of aerial long distance bombing expeditions during the war, and also that there were great possibilities for mail and freight carrying in times of peace.—*Washington Post*, 6/1.

GERMAN ADMIRAL HEADS BLACK SEA COMMISSION.—The Russo-German Commission which has gone to Odessa to discuss questions concerning the Black Sea has arranged a meeting for consideration of conditions under which interned civilians may be repatriated. The commission consists of 18 delegates, under the presidency of a German admiral. The chief Russian delegate is a sailor from the Black Sea fleet.—*N. Y. Herald*, 14/1.

BOLSHEVIKI SAILORS MASSACRE 60 OFFICERS OF BLACK SEA FLEET.—A terrible massacre of Russian naval officers of the Black Sea fleet by Bolsheviki sailors was reported from Sebastopol, January 14. At least 60 officers, four of them admirals, were said to have been slain during a two days' orgy of bloodshed.

A general was taken from the garrison and executed when he attempted to have loyal troops interfere. All of the officers of one ship were taken to Malakoff Tower and shot. The streets were littered with corpses of officers and men shot down in the fighting.—*Baltimore American*, 16/1.

TURKEY VIOLATES ARMISTICE.—Turkey has violated the armistice signed between the Central Powers and Russia, according to word received at Petrograd, January 14. The Ottoman commander, it was stated, had landed 20,000 troops between Trebizond and Rize and a Turkish submarine was reported to have sunk a Russian transport.—*Baltimore American*, 14/1.

UNITED STATES ARMY

BUSH TERMINAL, WITH BIG PIERS, TAKEN BY ARMY.—The Bush Terminal, comprising 20 city blocks, between Thirty-ninth and Fifty-first streets, Brooklyn, with 3100 feet of continuous water front, facing a 40-foot government channel, was requisitioned by the War Department yesterday.

The eight piers, each one-quarter of a mile in length, and the 120 warehouses will be used as a base for the Quartermaster's Department, United States Army.

The order for seizure of the terminal was issued in Washington, being practically the first official act of Major General Goethals, the new acting quartermaster general.

Word was at once telegraphed to Irving T. Bush, president, who last night informed a reporter for the *Herald* that every effort will be made by his working staff to assist the army in its operation of the terminal. He said between 2000 and 3000 employees will be affected immediately, and if the 20 miles of railroad and the industrial buildings are later commandeered a much larger force will pass under the control of the War Department.

Mr. Bush has been chief executive officer of the War Port Board since that organization was formed. He has just been notified he is appointed to a new post, that of Director of Harbor and Terminal Facilities of the Embarkation Service, United States Army. He will work in conjunction with Brigadier General Shanks, Military Commander of the Port of Embarkation in Hoboken. Mr. Bush said he regrets very much to see a business that it took 25 years to build up pass so quickly from his hands. He is very glad, however, to render assistance to the United States, he

insisted to a *Herald* reporter, and therefore willingly gives up the industries if his properties can be of use to the government.

At present the piers of the Bush Terminal are used by a score of steamship lines. One of these piers, with 15 acres of floor space, is used by the Russian Volunteer Fleet and other shipping companies of the Russian government. For months it has been practically idle, although millions of dollars' worth of supplies, ordnance and general merchandise are piled there. What to do with it is a problem—now to be settled by the United States Army.

Other steamship lines which must vacate are the Royal Belgium Line, the American-Hawaiian Steamship Company, the Austro-American Line (American agents have pier contracts), the Prince Line, Hansa Line, Norton Line, Bucknall Steamship Lines, Levant Line, American-African Line, Royal Dutch West India Mail, American and Australian Line and several others.

According to Moody's Manual, industrial section for 1917, the gross earnings of the Bush Terminal Company in 1916 were \$1,955,237, and the operating expenses and taxes amounted to but \$745,811. The real estate and improvements were valued December 31, 1916, at \$13,437,383, and the total assets then amounted to \$21,890,738.

Need for the proper protection of the Bush terminals has been recognized for several months by the War Department. An armed guard is maintained and sentries challenge every person who approaches unless certain instructions are followed. From time to time the terminal has been used for loading of supply vessels with cargoes for the government, the Red Cross and Belgian relief. It is expected that ample time will be given all holding leases to find new docking space.—*N. Y. Herald*, 1/1.

THE AMERICAN ARMY which is to be sent into battle to make the world safe for democracy is rapidly being formed. In the nine months since the United States declared that a state of war existed with Germany the army has risen from 212,034 officers and men to 1,539,506 officers and men.

This statement has been made by Secretary of War Baker, who declared that no other army in the history of the world had ever been raised, equipped or trained so quickly.

The Secretary added that a "substantial" force of Americans already was in France and fit for active service, and that full equipment is on hand for every man who will be sent to Europe during 1918.

On the fighting fronts the infantry is inactive, except for small raiding operations, but the artillery duels continue intense on various sectors.—*Baltimore American*, 10/1.

ENEMY AIRPLANES DROP BULLETS AND BOMBS.—Enemy air raiders are showing an increased interest in the American aviation centers, especially those nearest the lines.

During one of the most recent incursions the German airplanes descended within 250 feet of the ground, endeavoring to make sure that the several bombs which they dropped should hit their targets, which in most cases were buildings in which men were billeted. Luckily, the German aim, even at such close range, was poor, for no Americans were killed.

Another German machine which flew over the position later dropped a bomb from a higher altitude at a hangar. The bomb missed its mark, but dug a great hole in the adjoining field.

Spray of Bullets on Position.—At a certain place nearby an enemy squadron descended within 300 feet of the earth and sprayed an anti-aircraft machine gun position with a hail of bullets, but did not hit any of the gunners, all of whom were French.

The Americans at the most advanced aviation camp have found a novel mounting for the machine gun used for defence against enemy airplanes. When the guns for the newly dug pits arrived it was discovered that only

field carriages had been provided. These were unsuitable for aircraft defence work, so swivels were constructed from old motor truck springs. These improvised mounts are said to be as good as any used.

Worst Conditions Yet Experienced.—Icy roads turned into river beds, for torrential streams flowing from the melting snows on the hills, together with a downpour of fine rain, combined to make conditions the worst the American Army has experienced since crossing to France.

Through the zone of the army it was not infrequent to find the roads at places lined on either side with motor trucks which had been ditched. Mule-driven vehicles also were mired in many cases. In one stretch of road a mile long there were 14 vehicles ditched at night with the soldiers working hard to release them. The mule-drawn transport trains, indeed, suffered the most from the conditions, the animals slipping on the icy road beds and being unable to arise after falling until branches and twigs cut from trees were put under their feet.—*Washington Evening Star*, 16/1.

GOETHALS AS ACTING QUARTERMASTER GENERAL.—Reorganization of the War Department, begun with the creation last month of the War Council of high general officers, advanced a step further, January 7, with the appointment by Secretary Baker of Major General George Goethals, acting quartermaster general, to serve also as director of War Department transportation and storage. Wide economies in the use of cars and in shipping charges are expected from this centralization in one agency of functions heretofore exercised by five departmental bureaus independently.

Behind the announcement stands the probability that army purchasing also will be drawn together under a central control. Steps to this end are under consideration, but legislation may be required to carry it out. The question of finding a man for the job, however, already has been taken up. Some officers think the duty should be placed under the General Staff, but others believe a separate office should be created, to be filled by a civilian of national reputation for business ability. It is practically certain, however, that should a civilian be appointed he would be commissioned as a general officer, subject to all army law.

General Goethals, as acting quartermaster general, directs the supply, subsistence and pay departments of the army, supplemented by the embarkation and other services already established in his office, each with a general officer in charge. Under to-day's order he will, in addition, supervise transportation of all ordnance, engineer, signal corps, aviation service and coast artillery material, as well as quartermaster supplies and troops.

All bureaus heretofore independent in this regard have been directed to co-ordinate their demands upon the railroads and upon storage facilities through the director of transportation. He, in turn, will deal with the director of the railroads, the Shipping Board, or any other centralized agency for transportation or storage, presenting complete schedules of cars and tonnage needed, and working out routing and storage so as to get the most efficient use of the nation's facilities.—*Baltimore American*, 8/1.

AMERICAN FLIER DOWNS GERMAN AERO AT FRONT.—The former captain of the Princeton football team, now serving in the flying corps, brought down his first German plane, January 5, says the European edition of the *New York Herald*.—*Washington Evening Star*, 9/1.

DIFFICULT TO TRANSFER TO UNCLE SAM'S FORCES.—The Associated Press has received information that the American War Department has decided on rules governing the transfer of Americans serving with the British forces to the American Army, by which their present status will not be disturbed except in special cases, and where the transfer "is plainly in the interests of the United States."

This decision, it is said, was reached on the following grounds:

First, that Americans who enlisted with the British forces must have been prompted by patriotic motives to do so and that therefore it does not

matter whether they remain British or are transferred to their own flag, since they would be fighting for the same cause.

Second, in some cases, particularly with the Canadians, many of whom are Americans, transfers might seriously disorganize units.

Americans in Canadian Forces.—While no official statistics are available, it is fair to guess that there are at least from 25,000 to 30,000 Americans in the Canadian forces alone, and perhaps half as many more scattered through other British contingents in France, Mesopotamia, Palestine, and elsewhere. Hundreds of letters have been sent to the American authorities in London begging for transfer, but the authorities say they are unable to make concession to any special number of men without taking over the men as a whole.

In many instances, it is pointed out, the desires for transfers are not prompted by patriotism, but because of the chance to enjoy greater benefits and the higher pay of the American forces. The authorities argue that if in the first instance the men joined the British Army "to fight for principle," the principle is not changed if they remain with the British forces. Hence it has been decided that an officer in the British Army, who is an American and desires a transfer, must apply to the embassy in London, which will be guided in the premises by instructions from the War Department at Washington.

Hard to Obtain Transfer.—The rules adopted say that "it will not be the general policy of the War Department to request the release of an American holding a commission in a foreign service." Regarding enlisted men, the new rules say that release will only be considered of applicants who present themselves personally to the military attaché of the American embassy in London "with satisfactory documentary evidence of citizenship," and that the military attaché "may then, in special cases, ask for release." The rules add: "When so released, men are to proceed to France at their own expense and report for enlistment in our service to the headquarters of the American expeditionary force."

The rules provide that an enlisted man must also procure from the commander of his unit of the British forces a written recommendation that the commander regards his transfer to the American forces "in the interest of the United States."—*Washington Evening Star*, 5/1.

SAFEGUARD MUNITION SHIPS.—The danger of destruction in New York City by the explosion of a munition ship, such as occurred at Halifax, is being done away with by the adoption of new routes for handling such ships and new points for loading their barges and lighters, it was announced by government officials.

The new plan was worked out by the War Board of the Port of New York and army engineers. The menace to South Brooklyn, now present while munition ships are loaded in Gravesend Bay, is to be ended by moving the ships to a point where, even if an explosion did occur, the destruction on land would be comparatively slight. The ships will hereafter be loaded at a point too distant to endanger any part of the city. The route of barges and lighters carrying munitions on the bay has been fixed so that Manhattan Island and Brooklyn are said to be almost entirely free from danger, while no important points on the New Jersey shore of the bay are greatly menaced.—*N. Y. Times*, 10/1.

GENERAL NOTES

WHY GERMANY IS LOSING THE WAR.—Germany is the backbone of the Central Powers' military organization. Shatter her, and the whole fabric of the enemy's opposition falls to the ground. Because of this fact, France, Great Britain, and now the United States have massed their strength in France and Flanders. For the same reason Germany has maintained in

France and Flanders two-thirds of her total forces. To-day she has practically the whole of her armies—or what is left of them—on the western front and in Italy.

How may Germany be beaten?

In the early days of the war, when her armies were at their full strength, it was believed that the breakdown would come within her borders. We all remember the familiar predictions of 1915 and 1916. She was to suffer financial collapse; lacking cotton, nitre and copper, she would be unable to munition her vast armies; lacking food, she would starve.

Yet, to-day, with the fourth year of the war half spent, the German people are not starving for food; her armies are not starving for munitions; nor is she bankrupt, not at least in the eyes of her own people.

But, as year after year of the war passed by, it began to be realized that there was yet another menace to German success; a menace purely military in nature, remorseless in its approach, and absolutely fatal when it arrived—the menace of a shortage of man-power.

To-day, among all military men and among those civilians who have managed to maintain a true perspective of this vast war, it is known that the backbone of German resistance will be broken when the wastage of man-power—rifle-bearing man-power—has reached the point where it is no longer possible to man the battle front in sufficient strength to hold back the enemy.

This wastage and the ultimate arrival at the point of man-exhaustion are a mere question of mathematics—of addition and subtraction; the result is as certain as that water will not run up hill, or that the whole is greater than its part.

Of the four great necessities referred to, failure of any one of which would bring Germany down, the first three may be likened to a constantly-flowing river—the last to a reservoir of definite capacity. There is a certain amount of uncertainty as regards the first three—but the last, unless Germany can gain an early military decision, spells her certain and hopeless defeat.

You may carry the bucket to the stream as often as you like; but dip your bucket in the cistern too often and one day you shall find it dry.

To no one are these facts so well known as to the German staff; and no part of the German propaganda has been so cleverly handled as that which is designed to camouflage that human cistern, the contents of which have been drained away so swiftly as the war has run its course.

"Look at the map," cries von Hollweg.

"Look at the cistern," we answer; and with our eyes on that annual loss of one and a quarter million German fighting men who will never again shoulder a rifle, we care very little whether the blood-letting be done a little to the east or a little to the west of a line traced on a map.

As to the bankruptcy of Germany it can never happen so long as the Kaiser has a printing press to turn out a cataract of paper-money, and the German citizen is content to accept the output at its face value.

Nor will Germany fail to supply all the munitions that her rapidly-dwindling armies can use. She can dig coal and iron ore from her mines and coax nitrogen from the atmosphere for guns, shells and explosives—and keep on doing it indefinitely. The Serbian mines and the kitchen of the *hausfrau* will give their yield of copper. The stream will flow in sufficiency as long as the war shall last.

Food? There is enough arable land within the battle-lines to raise sufficient food to keep the citizen alive and provide a special ration for the man at the front.

Men? Before this war, military writers, the Germans included, told us that the proportion of the population in any country that could be made into fighting men was 10 per cent. The population of Germany is 68,000,000. As a matter of fact the mobilization has reached nearly 15 per cent,

and therefore in August, 1914, the potential fighting strength of Germany was about 9,500,000 men.

This was the reservoir from which the human material would have to be fed to the fighting lines. The nine and one-half million fighting men could never be affected by the birth rate—not unless the war should run for 18 years. The only supply available to offset the outflow was the physically efficient young men, some 450,000 who would reach the age of 18 each year. Unlike the question of paper money, or munitions or food, there is no process by which men can be printed in a printing press or fabricated in smelter, rolling mill and lathe. Nor can you dig up fighting men from the ground, like potatoes.

And not even the German chemists could make a substitute for human flesh and blood—though they probably dreamed even of that.

So there it stood at the beginning of the war, a cistern full to the brim with 9,500,000 men with a potential annual inflow of 450,000.

Now let us see what has been the rate of loss. There are two ways in which we may get at the facts: first the German official statements; second, the estimates made by the Allied Military Intelligence Departments (secret-service). And we find that these arrive at the same total loss—dead and hopelessly crippled—of about 5,000,000 men.

For the first two years Germany gave out official figures—doctored of course. But the Allies, through their secret-service agents in Germany, gathered the true figures by tabulating the notices sent to the relatives of the dead, and recorded on the roll of honor of churches, clubs, labor unions, etc. This revealed that about 1,150,000 men had been killed or taken prisoners, and reckoning the hopelessly crippled at 1,350,000 men, which is about the ratio of cripples to dead as determined in this war, we get a loss of 2,500,000 in the first two years and a total loss of about 5,000,000 men by August, 1918.

General Maurice, replying recently to General Ludendorff's statement that the British in making their slight gains in Flanders, this year, had lost 500,000 men, stated that they had never that number engaged on the sector in question. He stated, further, that they had accurate knowledge that the German losses had been 75 per cent greater than those of the British.

There is nothing surprising in this statement. Not only have the British a great superiority in gunfire—as have the French—with superior observation by aeroplane, but the Germans have frequently made a dozen or more counter attacks in close order during the furious fighting on the Somme and before Ypres. Their losses must necessarily be enormous.

Now the British losses as officially reported have been running as high as 30,000 a week. Eighty per cent of these, at least, or 24,000, must have occurred on the western front. During the winter months the losses have averaged about 10,000 per week. This gives an average for the year of 17,000 per week on this front.

Increasing this by 75 per cent gives a German loss on the British front of 29,750 per week.

Their losses to the French at such battles as the Marne, Champagne, Verdun, the Chemin-des-Dames, cannot be less—they may indeed be more.

The terrific fighting on the Russian front coupled with the Serbian, Roumanian and Italian drives may readily have resulted in average casualties of say 26,000 per week among the Germans.

The total average casualties on all fronts then would reach 85,500 per week. This would mean a total of 4,446,000 casualties in one year.

Now at the ratio of five wounded to one dead this would give a total of 741,000 dead per year.

The Germans have made some fantastic claims as to the number of wounded that are returned to full active service—claims of well over 90 per cent. If 76 per cent are so far restored that they can carry a rifle and endure the frightful ordeal of trench fighting it would be a notable result. Assuming 76 per cent so restored, we find that of the wounded, 889,200 are permanently crippled and rendered unfit.

But there is yet another leak in this cistern of man-power, which curiously is always overlooked. We refer to the fact that soldiers die from sickness as well as civilians. Our census of 1910 shows that the average death rate between the ages of 20 and 45 is about eight per thousand. The damp conditions of trench life, coupled with the extraordinary mental strain of modern warfare, will raise the rate above that of American civilian life, especially as undeveloped boys of 16 years and men up to 40 years of age are found in the German army. Assuming a rate of 10 per thousand, the loss through sickness would reach 68,000 per year. This figure would probably be maintained, because though the total army has decreased the quality of the troops has greatly deteriorated.

A summary of these totals for killed, permanently crippled, and dead through sickness, gives a yearly total of 1,698,200 men absolutely lost. To compensate for this Germany calls to the colors each year about 450,000 young men; not 600,000, which is a figure they give out for public consumption. The total annual loss therefore is 1,248,200. And if this rate be maintained until August, 1918, the total net loss will be 4,992,800 or say 5,000,000 men.

This it will be noted agrees with the total loss, as determined by the allied secret-service from the official notifications made by the government to the relatives of soldiers lost at the front.

Therefore we repeat, "Look at the cistern, not at the map."—*Scientific American*, 15/12.

BIG KRUPP PLANT AT ESSEN ABLAZE.—Workmen from Essen, Germany, say that the Krupp plant, the great German munitions establishment, has been ablaze for 24 hours.

The plant at Essen, the main establishment of the Krupps, the largest manufacturers in Germany of arms and munitions, employed about 30,000 men before the war. It has been expanded greatly during the war. Facts relating to its present size and the number of workmen are kept secret by the German Government. It was reported unofficially in October of last year that about 70,000 persons, including several thousand women, were at work there and that 20,000 were to be added to the force.

Early this year there was a strike at the Krupp works, said to have been due to lack of food. It was reported that 40,000 workers were involved and that the authorities combatted it by sending many of the men to the front, but little authentic information was permitted to come out of Germany.

Essen is in Rhenish Prussia about 40 miles from the Dutch border. Few places in Germany are guarded more carefully. No persons unknown to the German authorities are permitted to go to the town. The plant has been raided several times by French and British airmen, notwithstanding its formidable anti-aircraft defences. Press dispatches last July said 100 persons there had been killed in a raid by French airplanes and that considerable damage had been done to the works.

Krupps Quadruple Their Navy Plant.—The Krupps recently have quadrupled their naval plant near Kiel, according to a dispatch from Berlin by way of Berne to *La Suisse*. This was done at the request of the German Government for the purpose of making up losses in submarines, which, the dispatch adds, have been heavier than the German Admiralty admits.—*N. Y. Herald*, 23/12.

GIVE PAROLE INSTEAD OF BECOMING PRISONERS.—Commanders of German submarines now usually require the captains of merchant ships to give their parole instead of making them prisoners as heretofore, according to the annual report of the London-America Trading Company, a large British shipping concern. When men are paroled they cannot re-enter the merchant marine during the war. The companies employing them give them half pay until they obtain other employment.

"We have several ship captains in our employ who have sunk more than one German submarine, and a good many of our ships have had scraps with the enemy the past year," says the report. "Some have come home with holes in their funnels or sides, and others have failed to return. But when a ship has been torpedoed and gone down, the survivors hurry back to the offices of the firm, make a hasty report and then ask cheerily, 'When is the next ship to be ready?' That is the spirit of the mercantile marine."—*Washington Star*, 28/12.

TORPEDO MAKER HELD AS TRAITOR.—Paul Hennig, a German-born American citizen, for many years a petty officer in the Imperial German Navy, and who for the last five years has been foreman of the gyroscope department of the E. W. Bliss Torpedo Company in Brooklyn, was indicted on Friday as a traitor to the United States by a federal grand jury of the Eastern District of New York. The indictment is the first to be returned in New York City for treason since Congress declared war on Germany, and in the event of conviction the death penalty may be imposed. The offence charged is that Hennig tampered with the delicate gyroscope mechanisms in such a way as to render the torpedoes to which they were fitted imperfect, if not useless, after being discharged from the torpedo tubes of an American destroyer or submarine.

Hennig is about 43 years of age, and has been in the United States since 1908. Prior to coming to this country he was, according to the federal authorities, for a long period on duty at the German torpedo base at Kiel. He is described as a man of fine education and as an expert in everything that pertains to gyroscopes, particularly such as are used at the present time to control the movement of torpedoes after they are fired and while they are speeding toward their mark. He is himself the inventor of a gyroscopic attachment for torpedoes, which, it was said, has considerable merit.

It was stated in the Brooklyn Federal Building that about 90 Germans had been taken out of the Bliss Company works in the last few weeks. More than 80 enemy aliens who had been employed since war was declared in the Bliss works are now in internment camps. One of the men taken from the works several weeks ago was Karl Hennig, the 23-year-old son of the man indicted as a traitor on Friday. He was born in Germany of a German mother and came to this country with his father in 1908.—*N. Y. Times*, 30/12.

BRITISH PRISONERS HELD BY THE ENEMY total 46,712, of which 2257 are officers and 44,455 enlisted men. These prisoners include members of the regular army, territorial forces, Royal Navy and navy division.—*N-Ac Log*, 10/1.

GERMANY RUSHING MEN TO WESTERN FRONT.—The Berlin *Vossische Zeitung* states that Field Marshal von Hindenburg and General von Ludendorff arrived in Berlin Saturday morning, apparently for a new Crown Council. An official statement adds that the Crown Prince was also in Berlin and was received Saturday morning by the Kaiser.

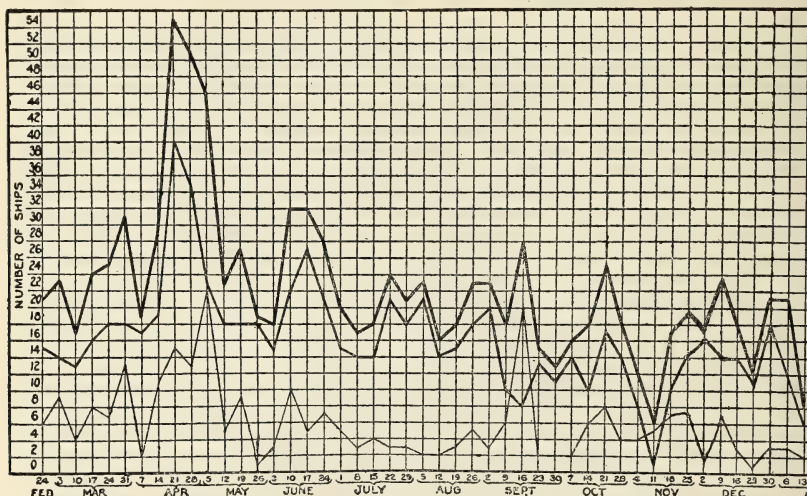
This journey of the Crown Prince to Berlin appears sudden, as he was at Aix-la-Chapelle Friday night, according to a prisoner's statement, apparently intending to await the arrival of German repatriated prisoners.

In some quarters to-night it is suggested that the Crown Council is connected with the expected western offensive. Attention is drawn to the fact that German troop trains are still running westward day and night. Only thoroughly fit men are carried through, weaklings or men showing any sign of unfitness being dropped at Red Cross stations on the way.—*N. Y. Times*, 18/1.

GERMANS DESTROY VILLAGES, MOSTLY NEAR ST. QUENTIN, AS A DEFENSIVE MEASURE.—The Rome correspondent of the *Matin* says that by order of Field Marshal von Hindenburg, according to reliable information which

has reached him, 130 villages behind the western front, mostly in the region of St. Quentin, have been leveled to the ground, so as to afford better opportunity for defence of the German lines to the rear.

Notwithstanding denials, the correspondent adds, only one-third of the 300,000 Belgians deported to Germany have been permitted to return to their homes.—*Evening Star*, 9/1.



BRITISH MERCHANT SHIPS SUNK.

Heavy Line.—Total.

Medium Line.—Over 1600 tons.

Light Line.—Under 1600 tons.

LOSS OF MERCHANT TONNAGE.—According to figures supplied by the Patriotic Education Society, Inc., Washington, D. C., the loss of world's tonnage up to September, 1917, actually amounted to 12,000,000 tons, although the destruction by submarine and mine was only 8,783,080 tons. This is figured by estimating the unusual depreciation due to the exigencies of war and including the ships that are held in port, as well as the falling off in the world's tonnage. If the war had not intervened, it is estimated that the world tonnage in 1917 would have been about 59,000,000 gross tons.—*Marine Engineering*.

DESTRUCTION OF BIG CHEMICAL PLANT STAGGERING MILITARY BLOW TO KAISER.—From a well-informed source the *Daily Telegraph* has received interesting particulars of the great explosion of November 22, by which the large chemical factory of Griesheim-Elektron, near Frankfort, was destroyed. No details were obtainable at that time, and no great attention was paid to the report in this country, no doubt from desire to avoid exaggeration of what might, after all, prove to have been an affair of no great importance. But the extreme care taken to prevent fuller accounts from getting out of Germany and the enforced silence of the German press on the subject, are the best proof of the German Government's anxiety to conceal a serious loss.

The first telegram to escape from Frankfort made a significant admission, which the subsequent silence only confirms. It announced that the excite-

ment in Frankfort caused by the explosion was tremendous. Information which has since been obtained makes it clear that there was good reason for excitement.

Like Military Defeat.—For it is now certain that the explosion caused the complete destruction of one of the greatest munitions factories in the world, by which Germany has suffered a disaster comparable to a serious military defeat in its effect on the issue of the war.

Under these circumstances it is a matter of supreme interest to understand precisely to what extent German military equipment was dependent on the source of supply which was wiped out.

The Griesheim factory was situated in the neighborhood of Frankfort, with an extensive frontage on the River Main. It consisted of an enormous group of buildings covering an area of more than 54 acres. Twenty-eight large chimneys, one of them higher than 200 feet, gave the impression more of an industrial town than a single factory, and numerous piers abutting on the river, combined with an extensive railway system, enabled the huge concern to distribute its product economically and quickly. Before the war it ranked as fourth in importance of the great German chemical works, and was always a flourishing company, paying a pre-war dividend of 14 per cent, and worth as a going concern more than 60,000,000 marks (£3,000,000).

Great Munitions Plant.—Its commanding position in the chemical world rested not only on its huge output but on the extensive variety of its manufactures. These comprised, among other things, aniline dyes of every description, nitric, sulphuric and other acids, phosphorus and alkali, with liquid chlorine, hydrogen and oxygen, as important by-products. What it meant to Germany as a source of munitions of war can thus be readily understood.

As one of the uncommon instances among German chemical works possessing installations of electro-chemical production, it was of prime importance as a source of synthetic nitrates, and its splendidly organized research laboratory enabled it to play a leading part in the production of poison gas and the other more refined forms of "frightfulness" which Germany has introduced in the course of the war. That the Imperial Government has taken the fullest advantage of these facilities is shown by the rapid increase of the works both in extent and output since the beginning of the war, and by the fact that the company has recently decided to increase its share capital by 50 per cent, an increase in which the German Government is more than suspected of having a financial interest.

Supplied Explosives Factories.—With regard to the productive capacity of Griesheim, some authoritative facts are available which cast an interesting light on the war activities of this concern. It has been producing saltpetre for the manufacture of black powders at the rate of 1000 tons a day, and it is reputed to be the only factory turning out this article. To such an extent has its already impressive output of soda nitrate and concentrated sulphuric acid been developed, that it supplied the whole demand of five nitroglycerin and dynamite factories, as well as two powder works, including that of Rottweil, one of the most important in Germany. Another explosive, which it manufactured in large quantities, was tontine, through its facilities for making synthetic phenol and consequently picric acid, from which acid this explosive is derived.

Another circumstance of special interest to us is the fact that this factory supplied large quantities of electrolytic hydrogen for the inflation of Zeppelins, and possessed by way of a reserve gasometers with a total capacity of more than 300,000 cubic feet. So important was it in this respect that a Zeppelin shed, usually containing two or three airships, was erected close to the works. For the balloons at the front the gas was supplied in steel tubes in the liquefied state.

Made Poison Gases.—Moreover, the extensive electrolytic plant was further utilized to produce asphyxiating gas, and lachrymatory and poisonous shells. Indeed, it was the greatest center of this manufacture in Ger-

many, and in 1916 the output of poison gases reached the colossal figure of nearly 900,000 cubic feet a day.

The extent of the material loss which Germany has suffered by the destruction of the Griesheim factory can thus be easily comprehended. But the disaster is of still wider significance. The variety of the materials formerly produced means, in such a closely interlocking industry as chemical manufacture, that every concern in Germany is affected, both from the cutting off of supplies, which many of them formerly drew from Griesheim, and from the necessity of making the loss of those supplies good from plants already working to their maximum.

The deaths of scores of trained workmen and specialists in the factory itself and in the dwellings within its confines will make the task of coping with the deficit all the more difficult. Even if the material loss can be successfully replaced, the problem of collecting miscellaneous quantities of explosives and acids from various quarters and conveying them over the greater distances thus made necessary is bound to complicate further the transport difficulty already regarded exceedingly pressing in Germany. It is impossible that the works can be reconstructed during the war, and sooner or later Germany must show on her fighting fronts the effects of this staggering blow which she has suffered within her own territory.—*Washington Post*, 6/1.

WAR RATIONING IN ENGLAND.—The cablegram of January 6 from Lord Rhondda describing the food situation in both England and France as "critical and anxious," seems to be at variance with what he said in an address at Silvertown three days earlier: "There is nothing alarming in the situation. You have only to tighten your belt. The people of this country are undergoing nothing like the privations in Germany. There they have less than a pound of meat a week." It will not do to jump to the conclusion that the British Food Controller was an alarmist in the one case and an optimist in the other. His cablegram to Mr. Hoover reflects a belief that lean days are coming for the people of the British Isles; the speech at Silvertown, if read between the lines, has very much the same significance; in both, compulsory rationing is declared to be necessary.

The policy of restricting and regulating the consumption of food will be entered upon with reluctance, for in Germany the authorities will seize upon British rationing as evidence of greater privation than the German people are called upon to endure, and the appeal will be made to tighten the belt a little more to win the war. It will be said exultantly that the British have been reduced to extremity by the success of the submarine campaign. The truth is that while foods, particularly meat, are none too plentiful in Great Britain and France and prices are high and advancing, want as the people of Germany and Austria know it does not exist. In France the cost of living has increased 100 per cent since the beginning of the war, and prices are now about double those prevailing in New York for eggs, butter, mutton, bacon and pork, and rice. Canned goods are scarce and higher. Potatoes and milk sell for about the prices asked here. In England foods are a little cheaper than in Paris.

For whatever shortage exists in Great Britain the people are in part to blame. They have been urged again and again to economize, but the response has not been what the government expected. The workers have been earning much higher wages in munition making and other war industries than they received before the war; and the truth is they have lived high, for them. There has been more sacrifice in the middle class than among the artisans and unskilled laborers. Probably from every point of view the gentry and aristocracy have made the most sacrifices in their habits of life as well as in money contributions to the war. The British people cannot eat their cake and have it. So compulsory rationing has become inevitable. Lord Rhondda sees "long queues of people waiting in

severe weather in practically every town in England for the necessities of life."

At the same time the ration plan is not to be comprehensive all at once, which means that the tight belt is for the present a figure of speech. First, meat will be conserved and given out in portions; then the turn of butter and margarine will come; and periodically, if the situation does not improve, other necessities will be added to the list. As a matter of fact, compulsory rationing, as contrived by Lord Rhondda, is a long look ahead. The American people will be shortsighted if they do not read a lesson from the regulated subsistence to which the British are now to be reduced because they failed to take the warnings of their Food Controller seriously.—*N. Y. Times*, 8/1.

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DIPLOMATIC NOTES

FROM DECEMBER 18 TO JANUARY 18

PREPARED BY

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RUSSO-GERMAN PEACE NEGOTIATIONS

FIRST MEETING AT BREST-LITOVSK.—On December 23 representatives of the Central Powers and the Bolshevik Government in Russia met at Brest-Litovsk to negotiate peace. The delegates were as follows:

Germany: Dr. Richard von Kühlmann, Foreign Minister; Herr von Rosenberg, Baron Von Hock, General Hoffmann, and Major Brinckmann.

Austria-Hungary: Count Czernin, Foreign Minister; Herr von Merey, Freiherr von Wissner, Count Collerda, Count Osaky, Field Marshal von Chiseries, Lieutenant Polarny, and Major Von Gluise.

Bulgaria: Minister Popoff, Former Secretary Cosseff, Postmaster General Stoyanovich, Colonel Gantjiff, and Dr. Anastasoff.

Turkey: Former Minister of Foreign Affairs Nessimy Bey, Ambassador Hakki, Under Foreign Secretary Hekmit Bey, and General Zekki Pasha.

Russia: Joffe Kamineff, Bisenko Pokrosky, Karaghan Lubinski, Weltman Pawlowich, Admiral Altvater, General Tumorrl, Colonel Rokki, Colonel Zeplett, and Captain Lipsky.

Prince Leopold of Bavaria, as Commander-in-Chief of the German forces in the east, welcomed the delegates and invited Hakki Pasha, as the senior delegate, to open the conference. Hakki Pasha, after an expression of a desire for a satisfactory result, declared the negotiations formally open, and proposed Dr. von Kühlmann as the presiding officer. The German Foreign Minister was unanimously elected chairman.

The German Foreign Minister proposed the following rules, which were adopted:

"Questions of precedence will be decided according to the alphabetical list of the represented powers.

"Plenary sittings will be presided over by the chief representative of each of the five powers in rotation.

"The following languages may be used in the debate: German, Bulgarian, Russian, and Turkish.

"Questions interesting only part of the represented powers may be discussed separately.

"Official reports of the proceedings will be drafted jointly."

At von Kühlmann's suggestion the chief Russian delegate stated the chief principles of the Russian peace program in a long speech, which coincided on the whole with the well-known resolutions of the Workmen's and Soldier's Deputies.

The delegates of the Central Powers declared their readiness to begin the examination of the Russian program. The result of their labors will be discussed at the next sitting.

COUNT CZERNIN'S TERMS FOR GENERAL PEACE.—On December 25 Count Czernin, speaking for the Central Powers, offered a statement of terms involving no "forcible annexations" and no indemnities. Since the Central Powers stipulated a general acceptance of these terms on the part of

Russia's allies, the Russian delegates requested a 10-day recess to consider the terms and present them to the Western Powers. Count Czernin's statement was as follows:

The delegations of the allied (Teutonic) powers, acting upon the clearly expressed will of their governments and peoples, will conclude as soon as possible a general peace. The delegations, in complete accord with the repeatedly expressed viewpoint of their governments, think that the basic principles of the Russian delegation can be made the basis of such a peace.

The delegations of the Quadruple Alliance are agreed immediately to conclude a general peace without forcible annexations and indemnities. They share the view of the Russian delegation, which condemns the continuation of the war purely for aims of conquest.

The statesmen of the allied (Teutonic) governments in programs and statements have emphasized time and again that for the sake of conquest they will not prolong the war a single day. The governments of the allies unswervingly have followed this view all the time. They solemnly declare their resolve immediately to sign terms of peace which will stop this war on the above terms, equally just to all belligerents without exception.

It is necessary, however, to indicate most clearly that the proposals of the Russian delegation could be realized only in case all the powers participating in the war obligate themselves scrupulously to adhere to the terms, in common with all peoples.

The powers of the Quadruple Alliance now negotiating with Russia cannot, of course, one-sidedly bind themselves to such terms, not having the guarantee that Russia's allies will recognize and carry out these terms honestly without reservation with regard to the Quadruple Alliance. Starting upon these principles, and regarding the six clauses proposed by the Russian delegation as a basis of negotiations, the following must be stated:

CLAUSE 1. Forcible annexations of territories seized during the war does not enter into the intention of the allied powers. About troops now occupy-seized territories, it must be stipulated in the peace treaty, if there is no agreement before, regarding the evacuation of these places.

CLAUSE 2. It is not the intention of the allies to deprive of political independence those nations which lost it during the war.

CLAUSE 3. The question of subjection to that or the other country of those nationalities who have not political independence cannot, in the opinion of the powers of the Quadruple Alliance, be solved internationally. In this case it must be solved by each government, together with its peoples, in a manner established by the constitution.

CLAUSE 4. Likewise, in accordance with the declaration of statesmen of the Quadruple Alliance, the protection of the rights of minorities constitutes an essential component part of the constitutional rights of peoples to self-determination. The allied governments also grant validity to this principle everywhere, in so far as it is practically realizable.

CLAUSE 5. The allied powers have frequently emphasized the possibility that both sides might renounce not only indemnification for war costs, but also indemnification for war damages. In these circumstances every belligerent power would have only to make indemnification for expenditures for its nationals who have become prisoners of war, as well as for damage done in its own territory by illegal acts of force committed against civilian nationals belonging to the enemy. The Russian Government's proposal for the creation of a special fund for this purpose could be taken into consideration only if the other belligerent powers were to join in the peace negotiations within a suitable period.

CLAUSE 6. Of the four allied powers, Germany alone possesses colonies. On the part of the German delegation, in full accord with the Russian proposals regarding that, the following is declared:

The return of colonial territories forcibly seized during the war constitutes an essential part of the German demands, which Germany cannot

renounce under any circumstances. Likewise, the Russian demand for immediate evacuation of territories occupied by an adversary conforms to German intentions. Having in view the nature of the colonial territories of Germany, the realization of the right of self-determination, besides the above outlined considerations, in the form proposed by the Russian delegation is at present practically impossible.

The circumstance that in the German colonies the natives, notwithstanding the greatest difficulties and the improbability of victory in a struggle against an adversary many times stronger and who had the advantage of unlimited import by sea, remained in the gravest circumstances faithful to their German friends, may serve as proof of their attachment and their resolve by all means to preserve allegiance to Germany, proof which by its significance and weight is far superior to any expression of popular will.

The principles of economic relations proposed by the Russian delegation in connection with the above six clauses are approved wholly by the delegations of the allied powers, who always have denied any economic restrictions, and who see in the re-establishment of regulated economic relations which are in accord with the interests of all people concerned, one of the most important conditions for bringing about friendly relations between the powers now engaged in war.

GERMANY'S SPECIFIC TERMS.—On returning from Brest-Litovsk on January 1 the Russian delegation presented the specific terms of the Central Powers as given at the conference. Russia objected to these terms chiefly on the ground that, according to Article I, Germany refused to evacuate Riga, Libau, and other parts of Russia until all elements in Russia had accepted the treaty; and that, as stated in Article II, Germany refused to move troops from Poland, Lithuania, Courland, and portions of Esthonia and Livonia, and considered that as these territories had already declared for independence, no further vote was necessary. The German terms were in substance as follows:

ARTICLE I. Russia and Germany are to declare the state of war at an end. Both nations are resolved to live together in the future in peace and friendship on condition of complete reciprocity. Germany will be ready as soon as peace is concluded with Russia and the demobilization of the Russian armies has been accomplished to evacuate her present positions in occupied Russian territory, in so far as no different inferences result from Article II.

ARTICLE II. The Russian Government, having, in accordance with its principles, proclaimed for all peoples, without exception, living within the Russian Empire, the right of self-determination, including complete reparation, takes cognizance of the decisions expressing the will of people demanding a full state of independence and separation from the Russian Empire for Poland, Lithuania, Courland, and portions of Esthonia and Livonia. The Russian Government recognizes that in the present circumstances these manifestations must be regarded as an expression of the will of the people, and is ready to draw conclusions therefrom. As in these districts to which the foregoing stipulations apply, the question of evacuation is not such as provided for in Article I, a special commission shall discuss and fix the time and other details in conformity and in accordance with the Russian idea of the necessary ratification by a plebiscite on broad lines and without any military pressure whatever of the already existing proclamation of separation.

ARTICLE III. Treaties and agreements in force before the war are to become effective if not directly in conflict with changes resulting from the war. Each party obligates itself, within three months after the signing of the peace treaty, to inform the other which of the treaties and agreements will not again become effective.

ARTICLE IV. Each of the contracting parties will not discriminate against the subjects, merchant ships or goods of the other parties.

ARTICLE V. The parties agree that with the conclusion of peace economic war shall cease. During the time necessary for the restoration of relations there may be limitations upon trade, but the regulations as to imports are not to be of a too burdensome extent and high taxes or duties upon imports shall not be levied. For the interchange of goods an organization shall be effected by mixed commissions to be formed as soon as possible.

ARTICLE VI. Instead of the commercial treaty of navigation of 1894-1904, which is abrogated, a new treaty will accord new conditions.

ARTICLE VII. The parties will grant one another during at least 20 years the rights of the most favored nation in questions of commerce and navigation. [This clause is apparently that carried in a German wireless message received in London and sent by cable on December 31.]

ARTICLE VIII. Russia agrees that the administration of the mouth of the Danube be intrusted to a European Danube commission, with a membership from the countries bordering upon the Danube and the Black Sea. Above Braila the administration is to be in the hands of the countries bordering the river.

ARTICLE IX. Military laws limiting the private rights of Germans in Russia and of Russians in Germany are abolished.

ARTICLE X. The contracting parties are not to demand payment of war expenditures, nor for damages suffered during the war, this provision including requisitions.

ARTICLE XI. Each party is to pay for damage done within its own limits during the war by acts against international law with regard to the subjects of other parties, in particular, their diplomatic and consular representatives, as affecting their life, health or property. The amount is to be fixed by mixed commissions with neutral chairmen.

ARTICLE XII. Prisoners of war who are invalids are to be immediately repatriated. The exchange of other prisoners is to be made as soon as possible, the times to be fixed by a German-Russian commission.

ARTICLE XIII. Civilian subjects interned or exiled are to be immediately released and sent home without cost to them.

ARTICLE XIV. Russian subjects of German descent, particularly German colonists, may within 10 years emigrate to Germany, with the right to liquidate or transfer their property.

ARTICLE XV. Merchantmen of any of the contracting parties which were in ports of any other party at the beginning of the war, and also vessels taken as prizes which have not yet been adjudged, are to be returned, or if that be impossible, to be paid for.

ARTICLE XVI. Diplomatic and consular relations are to be resumed as soon as possible.

NEGOTIATIONS RENEWED.—On January 3 Count von Hertling announced to the Reichstag that Dr. von Kühlmann had been instructed to reject Russia's proposal to transfer the conference to Stockholm, on the ground of difficulty of telegraphic communication with the capitals of the nations engaged and danger of interference from Russia's allies. Concerning Russia's rejection of the proposals relating to occupied territories, the Chancellor said: "We can cheerfully await the further course of this incident; we rely on our strong position, our loyal intentions, and our just rights." The decision to reject the Stockholm proposal was approved on January 4 by all parties in the Reichstag Main Committee save the Radical Socialists.

Sessions were renewed at Brest-Litovsk on January 8. Owing to failure of Russia's allies to take favorable action Germany withdrew the terms

offered in Count Czernin's statement of December 25. Dispatches of January 15 stated that the armistice had been extended to February 18, and that the peace conference had been adjourned to be continued later. In the session of January 11 difficulty arose over the Russian request that deported Poles and Lithuanians should be allowed to return, and that imprisoned Czechs and Bohemians in Austria should be liberated.

GERMAN PEACE ENVOYS HOLD DIVERGENT VIEWS.—Arthur Ransome, the Petrograd correspondent of *The Daily News*, sends the following under date of January 3:

"From a source which has hitherto proved reliable I learn the following suggestive details concerning the peace negotiations. Two perfectly distinct tendencies were noticeable in the enemy delegation, one annexationist, represented by General Hoffmann, the other more moderate, represented by Dr. von Kühlmann and Count Czernin. There were frequent disputes between these two tendencies, settled in each case by an appeal to Berlin. Berlin, without exception, supported Czernin and Kühlmann. Hoffmann takes a purely military view, and more than once complained with great bitterness of the Russian use of the armistice to agitate among the German soldiers."—*N. Y. Times*, 5/1.

SEPARATE PEACE WITH BULGARIA.—London, January 10.—A separate peace agreement has been signed by Russia and Bulgaria, according to the *Bund* of Berne, a dispatch from the Swiss capital reports. A Bulgarian correspondent says Premier Radoslavoff read the following dispatch from Brest-Litovsk in Parliament:

"War between Russia and Bulgaria ceases. Diplomatic and economic relations between Russia and Bulgaria are resumed. Russia recognizes Bulgaria's right to nominate a delegate to an international Danube commission. The first peace is thus concluded, with the consent of Bulgaria's allies."

Separate peace proposals made by Turkey have been refused by the Bolshevik Government, according to a report in Petrograd. Turkey was requested to participate in the general conference between Russia and the Central Powers.

A dispatch of January 5, from Petrograd, purported to give the Turkish peace terms as presented to Russia. Among the terms proposed by Turkey were free passage of the Dardanelles for Russian ships, Russian evacuation of Turkish territory, and demobilization of the Russian Black Sea fleet. Turkey was to retain her active army in consequence of continuation of war against the Entente.

Bulgaria took part with Germany, Austria, and Turkey in the first negotiations at Brest-Litovsk, and it has been assumed that no peace terms would be agreed to by the Central Powers except in concert. However, advices yesterday giving the names of those who took part in the first session of the Brest-Litovsk conferences when they were resumed this week made no mention of a Bulgarian representative.—*N. Y. Times*, 11/1.

INTERNAL CONDITIONS IN RUSSIA.—In December General Kaledine was re-elected leader of the Don Cossacks by a vote of 562 out of a total of 638. Reports to Petrograd from Kostov on January 10 announced the formation of the Republic of the Don with General Kaledine as President and Prime Minister. The territory included comprised more than 63,000 square miles in the Don basin in southeastern Russia. The purpose of General Kaledine was said to be not to fight the Bolsheviks but to end civil war.

According to Petrograd dispatches of January 6, the Rada, the Ukrainian legislative body, and the Bolsheviks had agreed to a compromise, by which the Ukraine agreed to withdraw support from General Kaledine and

his Cossacks in return for the removal of Bolshevik troops from Ukraine territory. Later reports stated that abundant food supplies had been secured for Petrograd through this settlement, the Ukraine agreeing to supply three billion pounds of bread within 60 days on payment half in cash and half in merchandise.

A Ukrainian delegate was admitted to the peace conference at Brest-Litovsk and submitted the following statement:

"The Ukrainian People's Republic brings the following to the knowledge of all belligerents and neutral states: The Central Rada, on November 20, proclaimed a People's Republic, and by this act an international status was determined. Striving for the creation of a confederation of all the republics which have arisen in the territory of the former Russian Empire, the Ukrainian People's Republic, through its General Secretariat, proceeds to enter into the independent relations pending the formation of a federal government in Russia and until the relations of the Ukraine with the future federation are established."

It was later announced that Germany and the Ukrainian Government had negotiated peace independently from the Bolshevik delegates.

FINLAND AND UKRAINE RECOGNIZED.—Germany announced, on January 6, that she recognized Finland as a republic. The *Paris Matin* stated on January 6 that France had recognized Finland as an independent state, and that a high commissioner had been sent to Kiev by the Allies to deal with the Ukraine. This action was taken "to assist each region to attain a form of government which in future shall assure the durable existence of the Russian federation."

CONSTITUENT ASSEMBLY DISSOLVED.—A Reuter's dispatch of January 20 stated that the Bolsheviks had dissolved the Constituent Assembly, which held its opening session January 18. At this session the anti-Bolshevik element succeeded in electing their candidate for chairman by a vote of 244 to 151. The Bolsheviks and extreme Social Revolutionists thereupon withdrew from the Assembly.

PEACE TERMS OF THE ALLIES.

PREMIER LLOYD GEORGE TO TRADES UNION CONFERENCE.—On January 5 Premier Lloyd George, speaking for the government and the nation before the Trades Union Conference in London, stated in the plainest language the essential peace terms demanded by the Allies.

Two weeks earlier, on December 20, the Premier had addressed the House of Commons on the same theme. In this earlier speech he made a favorable report on the shipping and submarine situation, stating that whereas available ship tonnage was "down about 20 per cent, imports had decreased in volume only 6 per cent." Reviewing the military situation, he called attention to successes in Palestine, the aid of America, and the difficulties created by the Russo-German armistice. He forecast further levies on man power, to be drawn from young men hitherto held in essential industries. Re-stating peace terms, he declared that Russia's interests were out of the hands of the Allies, and that German colonies would not be restored.

In the later speech, on January 5, following Count Czernin's statement of December 25 and the concrete terms presented to Russia, the Premier modified somewhat the position taken in his previous utterance. He first announced that he had consulted national leaders and representatives of overseas dominions, and could claim to speak "not merely the mind of the government, but of the nation and of the empire as a whole." He denied a war of aggression against Germany or a desire to disrupt the German state and declared that while a really democratic constitution in Germany would make it much easier to conclude peace, that, after all, was "a question for the German people to decide." He declared the terms offered by Count Czernin vague and deceitful, a device on the part of Germany to make territories nominally independent but actually under the political and economic domination of the Central Powers. He stated the essential conditions of a permanent peace as follows:

"The first requirement, therefore, always put forward by the British Government and their allies, has been the complete restoration, political, territorial, and economic, of independence of Belgium and such reparation as can be made for the devastation of its towns and provinces.

"This is no demand for a war indemnity, such as that imposed on France by Germany in 1871. It is not an attempt to shift the cost of war-like operations from one belligerent to another, which may or may not be defensible. It is no more and no less than an insistence that before there can be any hope for stable peace, this great breach of the public law of Europe must be repudiated and so far as possible repaired.

"Reparation means recognition. Unless international right is recognized by insistence on payment for injury, done in defiance of its canons, it can never be a reality.

Restoration of Alsace-Lorraine.—"Next comes the restoration of Serbia, Montenegro, and the occupied parts of France, Italy, and Rumania. The complete withdrawal of the allied (Teutonic) armies, and the reparation for injustice done is a fundamental condition of permanent peace.

"We mean to stand by the French democracy to the death in the demand they make for a reconsideration of the great wrong of 1871, when, without any regard to the wishes of the population, two French provinces were torn from the side of France and incorporated in the German Empire.

"This sore has poisoned the peace of Europe for half a century, and, until it is cured, healthy conditions will not have been restored. There can be no better illustration of the folly and wickedness of using a transient military success to violate national right.

Russia and the Allies.—"I will not attempt to deal with the question of the Russian territories now in German occupation. The Russian policy since the revolution has passed so rapidly through so many phases that it is difficult to speak without some suspension of judgment as to what the situation will be when the final terms of European peace come to be discussed.

"Russia accepted war with all its horrors because, true to her traditional guardianship of the weaker communities of her race, she stepped in to protect Serbia from a plot against her independence. It is this honorable sacrifice which not merely brought Russia into the war, but France as well.

"France, true to the conditions of her treaty with Russia, stood by her ally in a quarrel which was not her own. Her chivalrous respect for her treaty led to the wanton invasion of Belgium and the treaty obligations of Great Britain to that little land brought us into the war.

"The present rulers of Russia are now engaged, without any reference to the countries whom Russia brought into the war, in separate negotia-

tions with their common enemy. I am indulging in no reproaches. I am merely stating the facts with a view to making it clear why Great Britain cannot be held accountable for decisions, taken in her absence, and concerning which she has not been consulted or her aid invoked.

Prussian Designs upon Russia.—"No one who knows Prussia and her designs upon Russia can for a moment doubt her ultimate intention. Whatever phrases she may use to delude Russia, she does not mean to surrender one of the fair provinces or cities of Russia now occupied by her forces. Under one name or another (and the name hardly matters) those Russian provinces will henceforth be in reality a part of the dominions of Prussia. They will be ruled by the Prussian sword in the interests of the Prussian autocracy, and the rest of the people of Russia will be partly enticed by specious phrases and partly bullied by the threat of continued war against an impotent army into a condition of complete economic and ultimate political enslavement to Germany.

"We all deplore the prospect. The democracy of this country means to stand to the last by the democracies of France and Italy and all our other allies. We shall be proud to stand side by side by the new democracy of Russia. So will America and so will France and Italy. But if the present rulers of Russia take action, which is independent of their allies, we have no means of intervening to arrest the catastrophe which is assuredly befalling their country. Russia can only be saved by her own people.

"We believe, however, that an independent Poland, comprising all those genuinely Polish elements who desire to form a part of it, is an urgent necessity for the stability of Western Europe.

"Similarly, though we agree with President Wilson that a break-up of Austria-Hungary is no part of our war aims, we feel that unless genuine self-government on true democratic principles is granted to those Austro-Hungarian nationalities who have long desired it, it is impossible to hope for a removal of those causes of unrest in that part of Europe which have so long threatened the general peace.

"On the same grounds we regard as vital the satisfaction of the legitimate claims of the Italians for union with those of their own race and tongue. We also mean to press that justice be done to the men of Rumanian blood and speech in their legitimate aspirations. If these conditions are fulfilled, Austria-Hungary would become a power whose strength would conduce to the permanent peace and freedom of Europe instead of being merely an instrument to the pernicious military autocracy of Prussia that uses the resources of its allies for the furtherance of its own sinister purposes.

Turks to Keep Constantinople.—"Outside of Europe we believe that the same principles should be applied. While we do not challenge the maintenance of the Turkish Empire in the homelands of the Turkish race with its capital at Constantinople, the passage between the Mediterranean and the Black Sea being internationalized and neutralized, Arabia, Armenia, Mesopotamia, Syria, and Palestine are, in our judgment, entitled to a recognition of their separate national conditions.

"What the exact form of that recognition in each particular case should be need not here be discussed beyond stating that it would be impossible to restore to their former sovereignty the territories to which I have already referred.

"Much has been said about the arrangements we have entered into with our allies on this and on other subjects. I can only say that as the new circumstances, like the Russian collapse and the separate negotiations, have changed the conditions under which those arrangements were made, we are, and always have been, perfectly ready to discuss them with our allies.

Colonies to Settle Own Future.—"With regard to the German colonies, I have repeatedly declared that they are held at the disposal of a conference whose decision must have primary regard to the wishes and interests of the native inhabitants of such colonies. None of those territories is in-

habited by Europeans. The governing consideration, therefore, must be that the inhabitants should be placed under the control of an administration acceptable to themselves, one of whose main purposes will be to prevent their exploitation for the benefit of European capitalists or governments.

"The natives live in their various tribal organizations under chiefs and councils who are competent to consult and speak for their tribes and members and thus to represent their wishes and interests in regard to their disposal. The general principle of national self-determination is, therefore as applicable in their cases as in those of the occupied European territories.

"The German declaration that the natives of the German colonies have through their military fidelity in war shown their attachment and resolve under all circumstances to remain with Germany is applicable, not to the German colonies generally, but only to one of them; and in that case, German East Africa, the German authorities secured the attachment, not of the native population as a whole, which is and remains profoundly anti-German, but only of a small warlike class, from whom their *askaris*, or soldiers, were selected. These they attached to themselves by conferring on them a highly privileged position, as against the bulk of the native population, which enabled these *askaris* to assume a lordly and oppressive superiority over the rest of the natives.

"By this and other means they secured the attachments of a very small and insignificant minority, whose interests were directly opposed to those of the rest of the population and for whom they have no right to speak. The German treatment of the native populations in their colonies has been such as amply to justify their fear of submitting the future of those colonies to the wishes of the natives themselves.

"Finally there must be reparation for the injuries done in violation of international law. The peace conference must not forget our seamen and the services they have rendered to and the outrages they have suffered for the common cause of freedom.

Must Have Permanent Settlement.—"One omission we notice in the proposal of the Central Powers which seems to us especially regrettable. It is desirable and essential that the settlement after this war shall be one which does not in itself bear the seed of future war. But that is not enough. However wisely and well we may make territorial and other arrangements, there will still be many subjects of international controversy. Some, indeed, are inevitable.

"Economic conditions at the end of the war will be in the highest degree difficult owing to the diversion of human effort to warlike pursuits. There must follow a world shortage of raw materials, which will increase the longer the war lasts, and it is inevitable that those countries which have control of raw materials will desire to help themselves and their friends first. Apart from this, whatever settlement is made will be suitable only to the circumstances under which it is made, and as those circumstances change, changes in the settlement will be called for.

"So long as the possibility of a dispute between nations continues—that is to say, so long as men and women are dominated by impassioned ambition and war is the only means of settling a dispute—all nations must live under a burden, not only of having from time to time to engage in it, but of being compelled to prepare for its possible outbreak.

"The crushing weight of modern armaments, the increasing evil of compulsory military service, the vast waste of wealth and effort involved in warlike preparation—these are blots on our civilization, of which every thinking individual must be ashamed. For these and other similar reasons we are confident that a great attempt must be made to establish, by some international organization, an alternative to war as a means of settling international disputes.

"After all, war is a relic of barbarism, and just as law has succeeded violence as a means of settling disputes between individuals, so we believe that it is destined ultimately to take the place of war in settlement of controversies between nations.

"If, then, we are asked what we are fighting for, we reply, as we have often replied, We are fighting for a just and lasting peace, and we believe that before permanent peace can be hoped for three conditions must be fulfilled: First, the sanctity of treaties must be re-established; secondly, a territorial settlement must be secured, based on the right of self-determination or the consent of the governed, and, lastly, we must seek, by the creation of some international organization, to limit the burden of armaments and diminish the probability of war. On these conditions its peoples are prepared to make even greater sacrifices than those they have yet endured."

PRESIDENT WILSON'S PEACE PROGRAM.—In a message received with enthusiasm by all the allied peoples and warmly approved by nations still neutral, President Wilson, on January 8, re-stated before Congress the aims of the allied nations in the war. The specific terms were summarized in the following 14 points:

1. Open covenants of peace without private international understandings.
2. Absolute freedom of the seas in peace or war, except as they may be closed by international action.
3. Removal of all economic barriers and establishment of equality of trade conditions among nations consenting to peace and associating themselves for its maintenance.
4. Guarantees for the reduction of armaments to the lowest point consistent with domestic safety.
5. Impartial adjustment of all colonial claims, based upon the principle that the peoples concerned have equal weight with the interest of the government.
6. Evacuation of all Russian territory and opportunity for Russia's political development.
7. Evacuation of Belgium without any attempt to limit her sovereignty.
8. All French territory to be freed and restored, and reparation for the taking of Alsace-Lorraine.
9. Readjustment of Italy's frontiers along clearly recognizable lines of nationality.
10. Freest opportunity for autonomous development of the peoples of Austria-Hungary.
11. Evacuation of Roumania, Serbia and Montenegro, with access to the sea for Serbia, and international guarantees of economic and political independence and territorial integrity of the Balkan States.
12. Secure sovereignty for Turkey's portion of the Ottoman Empire, but with other nationalities under Turkish rule assured security of life and opportunity for autonomous development, with the Dardanelles permanently opened to all nations.
13. Establishment of an independent Polish state, including territories inhabited by indisputably Polish populations, with free access to the sea, and political and economic independence and territorial integrity guaranteed by international covenant.
14. General association of nations under specific covenants for mutual guarantees of political independence and territorial integrity to large and small states alike.

The speech in full follows:

Gentlemen of the Congress:

Once more, as repeatedly before, the spokesmen of the Central Empires have indicated their desire to discuss the objects of the war and the possible basis of a general peace. Parleys have been in progress at Brest-Litovsk between Russian representatives and representatives of the Central Powers, to which the attention of all the belligerents has been invited for the purpose of ascertaining whether it may be possible to extend these parleys into a general conference with regard to terms of peace and settle-

ment. The Russian representatives presented not only a perfectly definite statement of the principles upon which they would be willing to conclude peace, but also an equally definite program of the concrete application of those principles. The representatives of the Central Powers, on their part, presented an outline of settlement which, if much less definite, seemed susceptible of liberal interpretation until their specific program of practical terms was added. That program proposed no concessions at all, either to the sovereignty of Russia or to the preferences of the population with whose fortunes it dealt, but meant, in a word, that the Central Empires were to keep every foot of territory their armed forces had occupied—every province, every city, every point of vantage—as a permanent addition to their territories and their power. It is a reasonable conjecture that the general principles of settlement which they at first suggested originated with the more liberal statesmen of Germany and Austria, the men who have begun to feel the force of their own peoples' thought and purpose, while the concrete terms of actual settlement came from the military leaders who have no thought but to keep what they have got. The negotiations have been broken off. The Russian representatives were sincere and in earnest. They cannot entertain such proposals of conquest and domination.

Full of Significance and Perplexity.—The whole incident is full of significance. It is also full of perplexity. With whom are the Russian representatives dealing? For whom are the representatives of the Central Empires speaking? Are they speaking for the majorities of their respective Parliaments or for the minority parties, that military and imperialistic minority which has so far dominated their whole policy and controlled the affairs of Turkey and of the Balkan States, which have felt obliged to become their associates in this war? The Russian representatives have insisted, very justly, very wisely, and in the true spirit of modern democracy that the conferences they have been holding with the Teutonic and Turkish statesmen should be held within open, not closed, doors, and all the world has been audience, as was desired. To whom have we been listening, then? To those who speak the spirit and intention of the resolutions of the German Reichstag of the 9th of July last, the spirit and intention of the liberal leaders and parties of Germany, or to those who resist and defy that spirit and intention and insist upon conquest and subjugation? Or are we listening, in fact, to both, unreconciled and in open and hopeless contradiction? These are very serious and pregnant questions. Upon the answer to them depends the peace of the world.

Re-Statement of Specific Aims.—But whatever the results of the parleys at Brest-Litovsk, whatever the confusions of counsel and of purpose in the utterances of the spokesmen of the Central Empires, they have again attempted to acquaint the world with their objects in the war and have again challenged their adversaries to say what their objects are and what sort of settlement they would deem just and satisfactory. There is no good reason why that challenge should not be responded to, and responded to with the utmost candor. We did not wait for it. Not once, but again and again we have laid our whole thought and purpose before the world, not in general terms only, but each time with sufficient definition to make it clear what sort of definite terms of settlement must necessarily spring out of them. Within the last week Mr. Lloyd George has spoken with admirable candor and in admirable spirit for the people and government of Great Britain. There is no confusion of counsel among the adversaries of the Central Powers, no uncertainty of principle, no vagueness of detail. The only secrecy of counsel, the only lack of fearless frankness, the only failure to make definite statement of the objects of the war, lies with Germany and her allies. The issues of life and death hang upon these definitions. No statesman who has the least conception of his responsibility ought for a moment to permit himself to continue this tragical and outpouring of blood and treasure unless he is sure beyond a peradventure that the objects of

the vital sacrifice are part and parcel of the very life of society and that the people for whom he speaks think them right and imperative as he does.

Response to Russia.—There is, moreover, a voice calling for these definitions of principle and of purpose which is, it seems to me, more thrilling and more compelling than any of the many moving voices with which the troubled air of the world is filled. It is the voice of the Russian people. They are prostrate and all but helpless, it would seem, before the grim power of Germany, which has hitherto known no relenting and no pity. Their power apparently is shattered. And yet their soul is not subservient. They will not yield either in principle or in action. Their conception of what is right, of what is humane and honorable for them to accept, has been stated with a frankness, a largeness of view, a generosity of spirit, and a universal human sympathy which must challenge the admiration of every friend of mankind; and they have refused to compound their ideals or desert others that they themselves may be safe. They call to us to say what it is that we desire, in what, if in anything, our purpose and our spirit differ from theirs; and I believe that the people of the United States would wish me to respond with utter simplicity and frankness. Whether their present leaders believe it or not, it is our heartfelt desire and hope that some way may be opened whereby we may be privileged to assist the people of Russia to attain their utmost hope of liberty and ordered peace.

No Secret Peace.—It will be our wish and purpose that the processes of peace, when they are begun, shall be absolutely open, and that they shall involve and permit henceforth no secret understandings of any kind. The day of conquest and aggrandizement is gone by; so is also the day of secret covenants entered into in the interest of particular governments and likely at some unlooked-for moment to upset the peace of the world. It is this happy fact, now clear to the view of every public man whose thoughts do not still linger in an age that is dead and gone, which makes it possible for every nation whose purposes are consistent with justice and the peace of the world to avow now or at any other time the objects it has in view.

We entered this war because violations of right had occurred which touched us to the quick and made the life of our own people impossible unless they were corrected and the world secured once for all against their recurrence. What we demand in this war, therefore, is nothing peculiar to ourselves. It is that the world be made fit and safe to live in; and particularly that it be made safe for every peace-loving nation which, like our own, wishes to live its own life, determine its own institutions, be assured of justice and fair dealings by the other peoples of the world, as against force and selfish aggression. All the people of the world are in effect partners in this interest and for our own part we see very clearly that unless justice be done to others it will not be done to us.

World's Peace Program.—The program of the world's peace, therefore, is our program, and that program, the only possible program, as we see it, is this:

I. Open covenants of peace, openly arrived at, after which there shall be no private international understandings of any kind, but diplomacy shall proceed always frankly and in the public view.

II. Absolute freedom of navigation upon the seas, outside territorial waters, alike in peace and in war, except as the seas may be closed in whole or in part by international action for the enforcement of international covenants.

III. The removal, so far as possible, of all economic barriers and the establishment of an equality of trade conditions among all the nations consenting to the peace and associating themselves for its maintenance.

IV. Adequate guarantees given and taken that national armaments will reduce to the lowest point consistent with domestic safety.

V. Free, open-minded, and absolutely impartial adjustment of all colonial claims, based upon a strict observance of the principle that in determining all such questions of sovereignty the interests of the population

concerned must have equal weight with the equitable claims of the government whose title is to be determined.

VI. The evacuation of all Russian territory and such a settlement of all questions affecting Russia as will secure the best and freest co-operation of the other nations of the world in obtaining for her an unhampered and unembarrassed opportunity for the independent determination of her own political development and national policy, and assure her of a sincere welcome into the society of free nations under institutions of her own choosing; and, more than a welcome, assistance also of every kind that she may need and may herself desire. The treatment accorded Russia by her sister nations in the months to come will be the acid test of their good-will, of their comprehension of her needs as distinguished from their own interests, and their intelligent and unselfish sympathy.

VII. Belgium, the whole world will agree, must be evacuated and restored, without any attempt to limit the sovereignty which she enjoys in common with all other free nations. No other single act will serve as this will serve to restore confidence among the nations in the laws which they have themselves set and determined for the government of their relations with one another. Without this healing act the whole structure and validity of international law is forever impaired.

VIII. All French territory should be freed and the invaded portions restored, and the wrong done to France by Prussia in 1871 in the matter of Alsace-Lorraine, which has unsettled the peace of the world for nearly 50 years, should be righted, in order that peace may once more be made secure in the interest of all.

IX. A readjustment of the frontiers of Italy should be effected along clearly recognizable lines of nationality.

X. The peoples of Austria-Hungary, whose place among the nations we wish to see safeguarded and assured, should be accorded the freest opportunity of autonomous development.

XI. Roumania, Serbia, and Montenegro, should be evacuated; occupied territories restored; Serbia accorded free and secure access to the sea; and the relations of the several Balkan States to one another determined by friendly counsel along historically established lines of allegiance and nationality; and international guarantees of the political and economic independence and territorial integrity of the several Balkan States should be entered into.

XII. The Turkish portions of the present Ottoman Empire should be assured a secure sovereignty, but the other nationalities which are now under Turkish rule should be assured an undoubted security of life and an absolutely unmolested opportunity of autonomous development, and the Dardanelles should be permanently opened as a free passage to the ships and commerce of all nations under international guarantees.

XIII. An independent Polish State should be erected which should include the territories inhabited by indisputably Polish populations, which should be assured a free and secure access to the sea, and whose political and economic independence and territorial integrity should be guaranteed by international covenant.

XIV. A general association of nations must be formed under specific covenants for the purpose of affording mutual guarantees of political independence and territorial integrity to great and small states alike.

Stand Together to the End.—In regard to these essential rectifications of wrong and assertions of right, we feel ourselves to be intimate partners of all the governments and people associated together against the imperialists. We cannot be separated in interest or divided in purpose. We stand together until the end.

For such arrangements and covenants we are willing to fight and continue to fight until they are achieved; but only because we wish the right to prevail and desire a just and stable peace, such as can be secured only by removing the chief provocations to war, which this program does remove.

We have no jealousy of German greatness, and there is nothing in this program that impairs it. We grudge her no achievement or distinction of learning or of pacific enterprise such as have made her record very bright and very enviable. We do not wish to injure her or to block in any way her legitimate influence or power. We do not wish to fight her either with arms or with hostile arrangements of trade, if she is willing to associate herself with us and the other peace-loving nations of the world in covenants of justice and law and fair dealing. We wish her only to accept a place of equality among the peoples of the world—the new world in which we now live—instead of a place of mastery.

Neither do we presume to suggest to her any alteration or modification of her institutions. But it is necessary, we must frankly say, and necessary as a preliminary to any intelligent dealings with her on our part, that we should know whom her spokesmen speak for when they speak to us, whether for the Reichstag majority or for the military party and the men whose creed is imperial domination.

We have spoken now, surely, in terms too concrete to admit of any further doubt or question. An evident principle runs through the whole program I have outlined. It is the principle of justice to all people and nationalities, and their right to live on equal terms of liberty and safety with one another, whether they be strong or weak. Unless this principle be made its foundation, no part of the structure of international justice can stand. The people of the United States could act upon no other principle, and to the vindication of this principle they are ready to devote their lives, their honor, and everything that they possess. The moral climax of this, the culminating and final war for human liberty, has come, and they are ready to put their own strength, their own highest purpose, their own integrity and devotion to the test.

UNITED STATES

GOVERNMENT CONTROL OF RAILROADS.—On December 26 President Wilson issued a proclamation declaring that on December 28 the government would take possession and assume control “of each and every system of transportation and the appurtenances thereof located wholly or in part within the boundaries of the continental United States, and consisting of railroads, and owned or controlled systems of coastwise and inland transportation, engaged in general transportation.” This action did not include street and so-called interurban lines. Control of the railroads was vested in the Secretary of the Treasury, Mr. McAdoo, who was appointed Director General of Railroads. The President stated that he would recommend to Congress a guaranteed income to the railroads based on the average of their net profits during the three years ending June 30, 1917. This was estimated to represent an average profit of 5.32 per cent.

COAL SHORTAGE FORCES NATIONAL SHUT-DOWN.—On January 17 Fuel Administrator H. A. Garfield issued a proclamation ordering that all industries (with certain exceptions named by War and Navy departments), all professional offices (except physicians, dentists, and government officials), all stores and business buildings, should use no fuel, save sufficient to prevent freezing, on January 18, 19, 20, 21 and 22, and on each Monday following up to and including March 25. The order included all states east of the Mississippi and also Minnesota and Louisiana. The purpose of the order was to save fuel and at the same time lessen the burden of freight on the railroads.

GERMANY

PRUSSIAN REFORM BILLS.—Three reform bills have been introduced in the Prussian lower house. They are summarized as follows in the *Frankfurter Zeitung*:

"The first bill regulates the Prussian franchise as follows: Every Prussian subject who has been such for at least three years, has resided in the same parish at least one year, and is at least 25 years of age, will be entitled to vote. Each elector will have one vote and all elections will be by secret ballot. In cases where no candidate obtains an absolute majority, a second ballot will be necessary. The bill also provides for the redistribution of seats, giving a slight increase to the number of representatives in the larger towns.

"The second bill modifies the right of the Prussian Herrenhaus as regards the control of finances. Whereas, heretofore, the Herrenhaus could adopt or reject a budget *en bloc*, now the bill provides that henceforth a budget may be discussed in detail and single clauses amended.

"The third bill deals with the reform of the Herrenhaus and proposes that it shall be thus composed: Ten representatives of the princely houses, 24 from the princes and counts, 26 from the remainder of the hereditary nobility, 36 burgomasters, 36 great land-owners, 36 representatives of commerce and industry, 76 from local governing bodies, both municipal and rural, 36 from agriculture, 36 from trades, 12 from the artisan class, 16 from the universities, and 16 ecclesiastics, while the Kaiser, as King of Prussia, will nominate 150 other peers, making a total of 510 representatives."

While apparently introducing a favorable extension of the franchise, the first bill has been criticized by the German Socialist press on the ground that it needlessly increases the age limit and restricts the labor vote by long residence requirements.

The bills reconstructing the Upper House, while increasing the representation of the cities and the moneyed classes, leave that body safely under the control of the Emperor and nobility; and at the same time the Upper House is given a greatly increased power over financial measures. "In future," according to the *Westminster Gazette*, "it will be able to reverse the decision of the Lower House upon any particular vote, while the government will have power to proceed with the expenditure of money, even if the budget is not voted."

SOUTH AMERICA

ADDITIONAL LUXBURG DISPATCHES.—On December 20, Secretary Lansing, acting in concert with the Argentina Foreign Office, published 38 further dispatches between the German chargé at Buenos Aires and the Berlin Foreign Office, covering the period from July 7 to September 1, 1917, and dealing chiefly with negotiations in the *Toro* case and German intrigues in South America. The notes indicate that Count Luxburg regarded President Irgoyen of Argentina as favorably disposed, and sought through him to maintain a favorable attitude on the part of Argentina, Chili, and Bolivia. The notes are similar in tone to those published on September 8 and October 30, and contain little additional information.

REVIEW OF BOOKS

ON

SUBJECTS OF PROFESSIONAL INTEREST

"Under Fire (*Le Feu*), *The Story of a Squad*." By Henri Barbusse. Translated by Fitzwater Wray. \$1.50. (New York: E. P. Dutton & Co.)

There is already such a flood of personal memoirs of the great war that it is necessary to sort out the distinctive from the commonplace. One cannot read everything, even among war books. Everyone would agree, probably, that Empey's "Over the Top" stands high among the distinctive books, and there can be no question but that "Under Fire" belongs with it. In its French version, "Under Fire" received the prize awarded by the Académie Goncourt for the best book published in France last year. This verdict of approval by the critics has been confirmed by immediate popularity both in France and in America. Over 300,000 copies have been sold in France, and in its English version it has already run through nine editions since last August.

In one sense "Over the Top" and "Under Fire" are alike; both describe the life of the private in the trenches. In both we have the dug-out, the advance post, the firing platform, the vermin, the mud, the charge and countercharge. But the two books differ in tone as the authors differ in personality. Empey, an adventurous young American, tells his story with a lively sense of humor, much as a college boy might give an account of a vacation in the woods. After all, it was a big adventure, with many thrills and not a little fun. But M. Barbusse looks on the war through the eyes of maturity and reflection. He is an "intellectual," who stands in the bloody slime of the trenches with too poignant a sense of the horrors about him to feel any of the thrills of the younger man, or to share in his laughter. To the author of "Under Fire" this war is simply the most hideous tragedy the world ever saw.

The striking feature of this book is its vivid realism. Soldiers have complained that the correspondents have sent home only a washed and dressed image of the war. There can be no such complaint here. M. Barbusse takes pains to present the thing in its stark and horrible nakedness; consequently it is not the book for fastidious nerves. The author tries to give faithfully the life of his squad exactly as it is, in trench, rest billet, or dressing station. It appears that under the conditions of war these men come to have the same point of view toward everything, no matter from what part of France or what rank of society they came from. They bear no malice toward the Boche soldier, but always speak of the Boche officer as a kind of vermin. As for themselves they have ceased to hope; they merely endure. The one overmastering hatred that they all share is directed toward those in high places who have brought this war to pass.

The concluding chapter, "The Dawn," depicts a scene as impressive and as horrible as any circle of the Inferno. A group of soldiers, one of them

dying of his wound, lie mired in the Flanders plain, waiting for the dawn. As they lie there, half buried in the slime and surrounded by corpses, they talk on the war and its purposes; and they reach the conclusion that, after all, the real object of this war is to end war forever. This clearly is the object of the book itself. Certainly no one has ever written as terrible an indictment of what is called the "glory of war." W. O. S.

"Radio Communication." By John Mills, Research Department, Western Electric Company, Inc., Mem. Inst. Radio Eng., A. I. E. E., American Physical Society. 203 pages, $5 \times 7\frac{1}{2}$, illustrated. Price \$1.75. (New York City: McGraw-Hill Book Co.)

The advances in engineering are usually about a year old before they receive publicity in the current periodical literature. Before appearing in book form they may be anywhere from two to five years old. The present book is an exception to this statement, for in most respects it is very much up to date. As a consequence of this early appearance in book form, not all the errors have had time to be eliminated, occasional paragraphs are without proper headings, and the transition matter between subjects is not always entirely adequate.

The book might well be called "Notes" on Radio Communication. The notes on the Vacuum Tube as a Detector, the Vacuum Tube as an Oscillator, the Vacuum Tube as an Amplifier, the Telephone Receiver, and Circuits of More than One Degree of Freedom are excellent. Many of the notes are gems of clear explanation, with the possible exception of that on the Arc Generator.

This is not an elementary book from the point of view of either mathematics or of radio. To those who have done some previous reading in Radio, for example as in (a) Chapters 26, 27, and 28 of Volume I of Bullard's "Naval Electricians' Text Book," 1915 Edition, or in (b) Chapters 23, 24, and 25 of Volume I of the 1917 Edition of the same book, or in (c) Robison's "Manual of Wireless Telegraphy," or in (d) G. W. Pierce's "Principles of Wireless Telegraphy," then this book will be a very valuable supplement. The mathematical training of a graduate of the U. S. Naval Academy or of a technical school will be sufficient preparation for reading this book. The novel handling of the mathematics applicable to radio will be found very helpful. In many cases the mathematics has been very cleverly simplified. The book, however, cannot be called non-mathematical.

The Appendix, dealing with Transmission Over Wire Circuits, is of interest primarily in the transmission of speech over very long distance telephone lines.

The Problems with answers and solutions at the end of the book form a helpful adjunct to the text.

Summing up it may be said that although this set of notes was hurriedly put in print, it contains both mathematical and radio notes which should be of the greatest help to the student of radio engineering. The diagrams and problems are excellent. On the whole this is a most welcome and timely book.

L. A. D.

"Internal Combustion Engine Manual." By F. W. Sterling, Lieut. Comdr., U. S. Navy (Retired). 163 pages, 93 illustrations. Index of 3½ pages.

The manual has been written and revised to meet the needs of the course in marine engineering at the U. S. Naval Academy. This is the fourth edition of this book, which has now been used for eight years as a text book at the Naval Academy. The subjects of the several chapters are: Fuels; Construction; Types; Cycles, etc.; Carburetion; Ignition; Cooling and Lubrication; Governing and Indicator Cards; Operation, Troubles, and Remedies; Gasolene, Kerosene, and Alcohol Engines; Aerial Motors; The Diesel Engine. Included in the text are descriptions of the following U. S. Navy types: Gasolene engine, Diesel engines, and the Standard submarine chaser engine.

This book has been accepted by the U. S. Naval Service for the use of the student and the operator of the internal combustion engine, and is valuable in that it treats fully of the fundamentals of the subject as well as giving practical details of construction and directions for operation and upkeep.

G. J. M.

"The Journal of Submarine Commander Von Forstner," Translated by Mrs. Russell Codman. \$1.00 net. (Houghton, Mifflin Company.)

It is unfortunate that no author has yet given us a personal narrative of the activities of any navy in this war that can compare with Ian Hay's "First Hundred Thousand," or Empey's "Over the Top." The censorship has effectually limited the output of personal narratives by naval officers of our allies, and the books that have come from German sources, with the exception of the stories of the *Emden* and *Ayesha*, have been all too evidently a part of the German propaganda and intended wholly for home consumption. This "Journal of Submarine Commander Von Forstner" is interesting and admirably translated, but fails to tell us any more of the life and activities of the submarine flotilla than the reader can get from the quotations from German newspapers that find their way to this country. It is obviously intended for Teutonic readers and was published, originally, to justify the submarine warfare on commerce and to convince the German people that the U-boat operations would soon lead to victory.

Von Forstner describes briefly life aboard a submarine, how it is submerged and how its operations are conducted; he tells of several cruises made by the boat under his command during the period before "sinking without warning" became the policy of his Almighty War Lord. The journal must have been published in Germany before unrestricted submarine warfare became effective, because there is none of the usual German attempt at justification of this practice. John Hays Hammond, Jr., wrote the introduction in which he discusses the operations of the submarines and the practicable methods of restricting their activities.

As one of the books on the war, Von Forstner's Journal has its place in the library of the student of current history; after the war, when the censorship is lifted and the whole truth can be told, it will be interesting to note how little books like this one really told us of history while it was being made.

P. P. B.

NOTICE

The U. S. Naval Institute was established in 1873, having for its object the advancement of professional and scientific knowledge in the Navy. It is now in its forty-fifth year of existence, trusting as heretofore for its support to the officers and friends of the Navy. The members of the Board of Control cordially invite the co-operation and aid of their brother officers and others interested in the Navy, in furtherance of the aims of the Institute, by the contribution of papers and communications upon subjects of interest to the naval profession, as well as by personal support and influence.

On the subject of membership the Constitution reads as follows:

ARTICLE VII

Sec. 1. The Institute shall consist of regular, life, honorary and associate members.

Sec. 2. Officers of the Navy, Marine Corps, and all civil officers attached to the Naval Service, shall be entitled to become regular or life members, without ballot, on payment of dues or fees to the Secretary and Treasurer. Members who resign from the Navy subsequent to joining the Institute will be regarded as belonging to the class described in this Section.

Sec. 3. The Prize Essayist of each year shall be a life member without payment of fee.

Sec. 4. Honorary members shall be selected from distinguished Naval and Military Officers, and from eminent men of learning in civil life. The Secretary of the Navy shall be, *ex officio*, an honorary member. Their number shall not exceed thirty (30). Nominations for honorary members must be favorably reported by the Board of Control. To be declared elected, they must receive the affirmative vote of three-quarters of the members represented at regular or stated meetings, either in person or by proxy.

Sec. 5. Associate members shall be elected from Officers of the Army, Revenue Cutter Service, foreign officers of the Naval and Military professions, and from persons in civil life who may be interested in the purposes of the Institute.

Sec. 6. Those entitled to become associate members may be elected life members, provided that the number not officially connected with the Navy and Marine Corps shall not at any time exceed one hundred (100).

Sec. 7. Associate members and life members, other than those entitled to regular membership, shall be elected as follows: "Nominations shall be made in writing to the Secretary and Treasurer, with the name of the member making them, and such nominations shall be submitted to the Board of Control. The Board of Control will at each regular meeting ballot on the nominations submitted for election, and nominees receiving a majority of the votes of the board membership shall be considered elected to membership in the United States Naval Institute."

Sec. 8. The annual dues for regular and associate members shall be two dollars and fifty cents, all of which shall be for a year's subscription to the UNITED STATES NAVAL INSTITUTE PROCEEDINGS, payable upon joining the Institute, and upon the first day of each succeeding January. The fee for life membership shall be forty dollars, but if any regular or associate member has paid his dues for the year in which he wishes to be transferred to life membership, or has paid his dues for any future year or years, the amount so paid shall be deducted from the fee for life membership.

ARTICLE X

Sec. 2. One copy of the PROCEEDINGS, when published, shall be furnished to each regular and associate member (in return for dues paid), to each life member (in return for life membership fee paid), to honorary members, to each corresponding society of the Institute, and to such libraries and periodicals as may be determined upon by the Board of Control.

The PROCEEDINGS are published monthly; subscription for non-members, \$3.00; enlisted men, U. S. Navy, \$2.50. Single copies, by purchase, 30 cents; issues preceding January, 1918, 50 cents.

All letters should be addressed U. S. Naval Institute, Annapolis, Md., and all checks, drafts, and money orders should be made payable to the same.

SPECIAL NOTICE

NAVAL INSTITUTE PRIZE ESSAY, 1919

A prize of two hundred dollars, with a gold medal, and a life-membership (unless the author is already a life member) in the Institute, is offered by the Naval Institute for the best essay on any subject pertaining to the naval profession published in the PROCEEDINGS during the current year. The prize will be in addition to the author's compensation paid upon publication of the essay.

On the opposite page are given suggested topics. Essays are not limited to these topics and no additional weight will be given an essay in awarding the prize because it is written on one of these suggested topics over one written on any subject pertaining to the naval profession.

The following rules will govern this competition:

1. All essays published in the PROCEEDINGS during 1918, which are deemed by the Board of Control to be of sufficient merit, will be passed upon by the Board during the month of January, 1919, and the award for the prize will be made by the Board of Control, voting by ballot.

2. No essay received after November 1 will be available for publication in 1918. Essays received subsequent to November 1, if accepted, will be published as soon as practicable thereafter.

3. If, in the opinion of the Board of Control, the best essay published during 1918 is not of sufficient merit to be awarded the prize, it may receive "Honorable Mention," or such other distinction as the Board may decide.

4. In case one or more essays receive "Honorable Mention," the writers thereof will receive a minimum prize of seventy-five dollars and a life-membership (unless the author is already a life member) in the Institute, the actual amounts of the awards to be decided by the Board of Control in each case.

5. Essays are limited to fifty (50) printed pages in the PROCEEDINGS of the Institute.

6. It is requested that all essays be submitted typewritten and in duplicate; essays submitted written in longhand and in single copy will, however, receive equal consideration.

7. In the event of the prize being awarded to the winner of a previous year, a gold clasp, suitably engraved, will be given in lieu of the gold medal.

By direction of the Board of Control.

G. M. RAVENSCROFT,

Lieut. Commander, U. S. N., Secretary and Treasurer.

PRIZE ESSAY TOPICS

SUGGESTED AT THE INVITATION OF THE BOARD OF CONTROL

BY

THE PRESIDENT OF THE NAVAL INSTITUTE, THE SUPERINTENDENT OF THE NAVAL ACADEMY, THE PRESIDENT OF THE NAVAL WAR COLLEGE, AND THE COMMANDERS-IN-CHIEF OF THE ATLANTIC, PACIFIC AND ASIATIC FLEETS.

- "The Mutual Relations of Gunnery and Tactics."
- "The Place of the Naval Officer in International Affairs."
- "The Evolution of Naval Doctrine from National Character."
- "The Training of Enlisted Personnel to Produce Modern Man-o'-Warsmen: (a) Military Training; (b) Moral Training; (c) Education."
- "The Organization, Employment and Training of Reserve Fleets and Flotillas."

LIST OF PRIZE ESSAYS

"WHAT THE NAVY HAS BEEN THINKING ABOUT"

1879

Naval Education. Prize Essay, 1879. By Lieut. Commander A. D. Brown, U. S. N.

NAVAL EDUCATION. First Honorable Mention. By Lieut. Commander C. F. Goodrich, U. S. N.

NAVAL EDUCATION. Second Honorable Mention. By Commander A. T. Mahan, U. S. N.

1880

"The Naval Policy of the United States." Prize Essay, 1880. By Lieutenant Charles Belknap, U. S. N.

1881

The Type of (I) Armored Vessel, (II) Cruiser Best Suited to the Present Needs of the United States. Prize Essay, 1881. By Lieutenant E. W. Very, U. S. N.

SECOND PRIZE ESSAY, 1881. By Lieutenant Seaton Schroeder, U. S. N.

1882

Our Merchant Marine: The Causes of Its Decline and the Means to Be Taken for Its Revival. "Nil clarius aquis." Prize Essay, 1882. By Lieutenant J. D. Kelley, U. S. N.

"MAIS IL FAUT CULTIVER NOTRE JARDIN." Honorable Mention. By Master C. G. Calkins, U. S. N.

"SPERO MELIORA." Honorable Mention. By Lieut. Commander F. E. Chadwick, U. S. N.

"CAUSA LATET: VIS EST NOTISSIMA." Honorable Mention. By Lieutenant R. Wainwright, U. S. N.

1883

How May the Sphere of Usefulness of Naval Officers Be Extended in Time of Peace with Advantage to the Country and the Naval Service? "Pour encourager les Autres." Prize Essay, 1883. By Lieutenant Carlos G. Calkins, U. S. N.

"SEMPER PARATUS." First Honorable Mention. By Commander N. H. Farquhar, U. S. N.

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What Changes in Organization and Drill Are Necessary to Sail and Fight Effectively Our Warships of Latest Type? "Scire quod nescias." Prize Essay, 1886. By Lieutenant Carlos G. Calkins, U. S. N.

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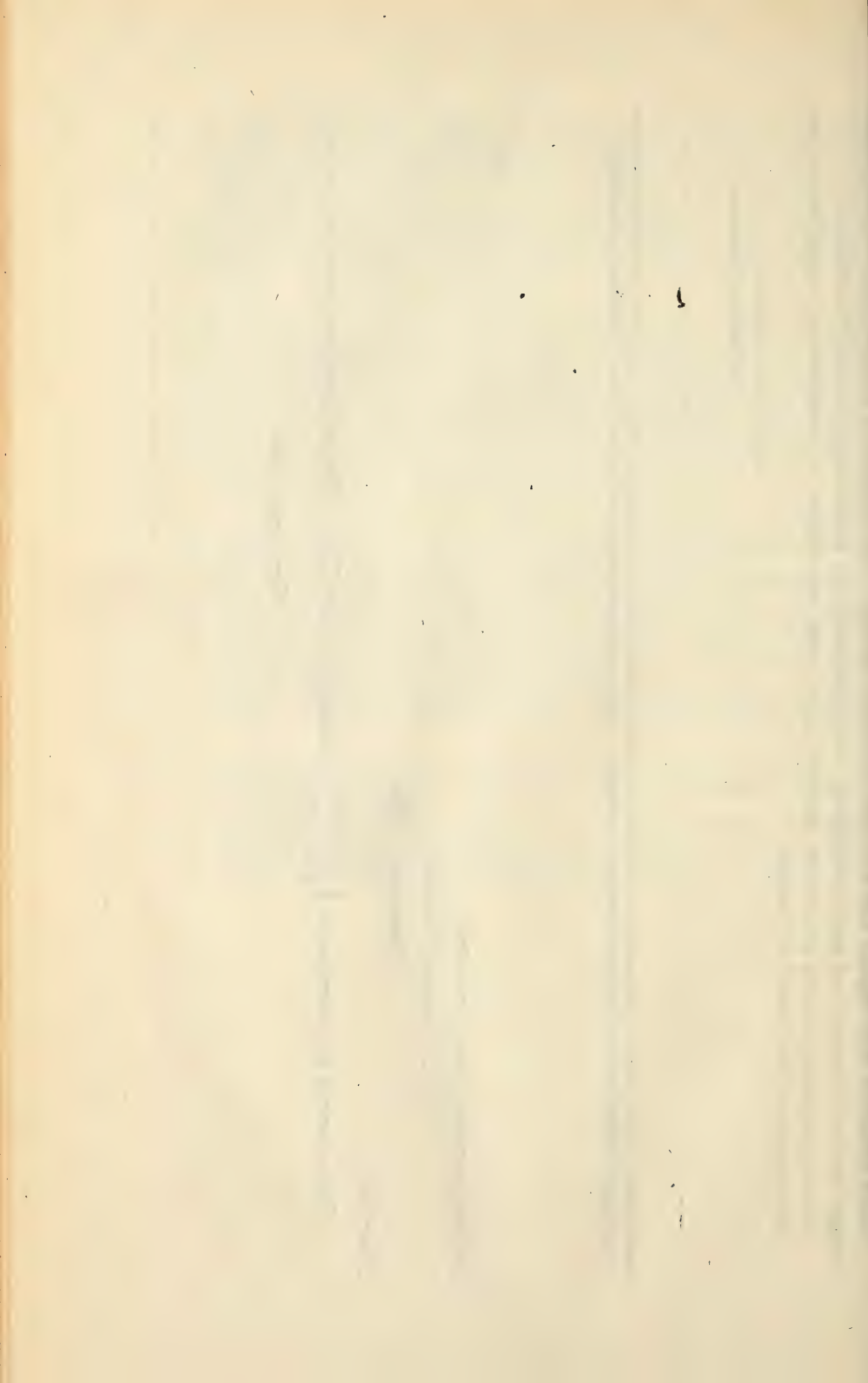
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THE UNITED STATES STEAMERS SCORPION, SPITFIRE, VIXEN AND SCOURGE, WITH 40 BARGES IN TOW,
CROSSING THE BAR AT THE MOUTH OF TOBASCO RIVER, MEXICO.

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“ALVARADO HUNTER”

A BIOGRAPHICAL SKETCH

By REAR ADMIRAL CASPAR F. GOODRICH, U. S. Navy

INTRODUCTORY

For some time past I have thought that too little is generally known of our minor naval heroes, men who served their country faithfully; took their full share in her battles; on occasion offered up their lives on the altar of patriotism, their last great sacrifice; but, who, from causes beyond their control, failed to achieve the national distinction of a John Paul Jones, Barry, Hull, Decatur, Bainbridge and Farragut among others whose memory their fellow countrymen still delight to honor. It was but natural, therefore, that I should gladly seize upon the opportunity, so kindly extended by Lieutenant George T. Emmons, U. S. Navy, of running over some of the papers accumulated and preserved with scrupulous care by his father, the late Rear Admiral George F. Emmons, U. S. Navy. Almost the first item to meet my eye contained the charges against the late Lieutenant Charles G. Hunter, U. S. Navy, with the sentence of the court and the public reprimand pronounced by his commander-in-chief at the time of the Mexican War. This, a *cause célèbre* of that day, is referred to more or less briefly in all naval histories. From the episode which gave rise to the court martial, Hunter acquired the soubriquet of “Alvarado,” by which he has since been universally known. The finding in Admiral Emmons’ papers of copies of the original docu-

ments in this affair seemed a call to put into practice my rather vague idea of reviving interest in the sailors whose service in subordinate capacities, however valuable, still lack that public recognition to which they appear to be entitled. To the query, "Why not begin with Alvarado Hunter?" I could make no reply other than an acceptance of the task which chance appeared to have allotted me. If I can depict the splendid gallantry he displayed on the Mexican coast and tell of the grave injustice to which he was subjected in consequence, I shall have discharged a portion of a self-imposed duty; but fairness to all concerned necessitates an attempt to bring to light the character of the man himself, with his faults, errors, misfortunes as well as his virtues and his successes, for Hunter's nature was an extraordinary mosaic of strengths and weaknesses.

EARLY YEARS

The subject of this sketch was born November 9, 1809, in Trenton, N. J., the son of an eminent lawyer of that city. He was admitted to West Point on July 1, 1824, as appointed from the state of New Jersey. On November 30 of the same year he tendered his resignation for reasons not to be found, the records of that institution having been almost completely destroyed by fire in 1838,¹ but it may be presumed that he preferred a naval career and sought transfer to the web-footed branch of the service. His warrant as midshipman was dated November 9, 1824. He joined the U. S. S. *North Carolina*, 74, from which, at Port Mahon, February 18, 1826, he forwarded the formal acceptance of his warrant. Why this long delay and what he did between the dates of his appointment and his acceptance are not known. He served three years on board of the *North Carolina*, then two more on board of the schooner *Porpoise* and the frigate *Java*, still in the Mediterranean. After an absence from home of nearly five years he returned (probably in the *Java*) to be examined for promotion. On February 20, 1830, he was made a "passed midshipman," thus mounting the first step of the hierarchical ladder.

It is about this time that the official record begins to show evidence of Hunter's disposition, which was certainly wayward

¹Letter of Colonel C. P. Townsley, superintendent of the Military Academy.

if not indeed occasionally quarrelsome. The particular occurrence in illustration had a tragic ending. It may thus be summarized. Towards the close of the year 1829, at a dinner in Philadelphia, a Mr. G. made a remark which was considered offensive by a Mr. D. The dispute was amicably settled. Early in 1830, Dr. D., a brother of D., received an unpleasant anonymous letter and charged G. with its writing. G. denied the charge and sent to D. a challenge which D. refused to accept. Now appeared on the scene Midshipman Duryee as G.'s friend and William Miller, a promising young lawyer of Philadelphia, as D.'s friend. Midshipman D. denounced D., who challenged him. A Lieutenant Westcott turned up as Midshipman D.'s friend. Being a strict interpreter of the code, W. declared that Midshipman D. should not meet D. until D. had met G. A written request that a joint conference be held by friends of Duryee and D. was refused by Miller who did not wish to reopen the controversy. Hunter, as Duryee's friend, visited Miller and obtained a promise that the written request just mentioned should be destroyed. After Miller had burnt all the copies believed to exist, the letter appeared in print, whereupon Hunter charged Miller with the responsibility of the publication and challenged him. Miller, having declined the challenge, was posted as a coward and had to fight. The duel took place March 21, 1830, near Chester, Pennsylvania. Miller was killed at once. Gazing at the prostrate form, Hunter said: "Gentlemen, I assure you that I had no enmity against that man. His blood must rest upon the heads of others who dragged him into the quarrel."² It was averred by those who knew Lieutenant Hunter well that remorse for this fatal act haunted him through life, inducing a restless craving for distraction of mind which made constant excitement a necessity to him.³ Ten days later all the naval officers implicated in this sad affair, including Hunter, were summarily dismissed by President Jackson.

We should not judge Hunter and his colleagues too harshly or by the standards of to-day, when nothing is more unusual or seems

² *United States Gazette*, March 24, 1830, which also prints the correspondence preceding the duel. For other details, see Dr. Chas. O. Paullin's "Duelling in the Old Navy," *PROC. NAV. INST.*, No. 132; also, the "Fatal Duel between Hunter and Miller," Jonathan Elliott, Washington, 1830.

³ Newspaper clipping of 1856, pasted in the Philadelphia Library's copy of Sabines' "Notes on Duelling."

more barbarous than the duello. In his time the "code" was not only revered in theory, but was followed as a practical guide in the conduct of officers and of those who called themselves gentlemen. None the less, this instance appears to have been exceptionally cold-blooded and unnecessary. A contemporaneous obituary of Hunter states that

warrants were issued for his arrest, and he was forced to flee to avoid apprehension. He first went to Boston, and from thence to Montreal. He soon after returned in disguise to New Jersey, and remained for some time secreted in the house of a Mrs. Griffiths, in the town of New Brunswick. While so secreted he became enamored of his protector's daughter, and was subsequently married to her. When the commotion caused by the duel had in some measure subsided, he went to Washington, obtained an interview with General Jackson, explained all the facts connected with the duel, and solicited to be restored to his former position. The President listened silently to the young man's appeal, and answered it by saying, "I will think of the matter." The next day young Hunter received notice that through the partiality of the President he was restored to his former post.⁴

This is not strictly accurate, for he was put at the foot of the list of passed midshipmen and not allowed pay for the time he was out of the navy.⁵

Part of the year of his restoration (1833) he commanded the schooner *Shark*, one gun, employed in the protection of timber on our southern coast. From the *Shark* he was transferred to the sloop-of-war *Falmouth*, 18 guns, in the West Indies squadron. His promotion to the grade of lieutenant is dated June 24, 1834.

His next cruise, 1837, on board of the frigate *United States* in the Mediterranean, was marked by his court martial for "gross and ungentlemanly conduct" and "misstating facts." The whole affair seems trivial, not to say amusing. The *United States* was lying in Port Mahon, Minorca Island, in the company of some other vessels, notably the French and British flagships. To create diversion, the American officers arranged a race on shore, Hunter backing a horse against a mare, the former to receive a stated distance allowance. At the conclusion of the race one of the judges, without consulting the others, declared the horse "distanced"—a finding which Hunter, who was close to the distance line, saw to be incorrect. He therefore at once entered a vigorous, not to say noisy, protest which naturally occasioned some dispute. Perceiving the confusion, his commander-in-chief, Commodore

⁴ *Pennsylvanian*, March 7, 1856.

⁵ Navy Department Records.

Jesse D. Elliott, rode up to the scene on a jackass, gesticulating wildly with a heavy walking stick, which he also used to prod his reluctant mount, and calling out repeatedly to Hunter "not to separate the officer from the gentleman." To this Hunter replied each time that he had not and never did. Whereupon the irate commodore ordered him off to his ship, put him under suspension and three days later brought him before a general court martial. The evidence, as solemnly printed in Executive Documents of the 25th Congress, makes delightful reading. Incidentally we get an idea of the real Hunter as known to his contemporaries. Witnesses testifying as to his character spoke of him as of "an energetic disposition"; as in manner "rather earnest and determined"; as "generally quick and with feeling." Of the charges preferred against him Hunter was "fully acquitted."

Did that end the matter? Quite the contrary. In his written defence he refers to Elliott's age, rank and achievements in such handsome terms as to make the latter believe them to have been sarcastic—which they doubtless were. So immediately he court-martialed Hunter again for using "contemptuous and satirical language to his commander-in-chief." The result was the same as in the first trial; the court promptly acquitted him. Whereupon Hunter preferred charges against Elliott and sent them to the Navy Department. No action followed.⁶

It is probable that Commodore Elliott, chafing under his failure to discipline Hunter and resenting Hunter's report to the Secretary of the Navy, sent him home at the earliest opportunity; for he was on leave the first of January, 1838, and was kept off duty until some time in 1839, when he joined the receiving ship at Norfolk. That he was again on leave January 1, 1841, is a bit suggestive of another row, of which, however, no record has been found.

On board the sloop-of-war *Fairfield* in the Mediterranean he made a three-year cruise which seems to have been peaceful so far as he was concerned, although marked by the mysterious murder at Port Mahon in 1842 of his mess-mate Patterson, the sailing master of the *Fairfield*. Late one night, while descending the hill by the winding path which led to the landing place and preceding, at some little distance, Hunter and the *Fairfield's* surgeon, Patterson was attacked and stabbed to the heart. His

⁶ Executive Documents, 25th Congress, 3d Session, Vol. III, 1838-1839.

cry brought his companions to his side, the surgeon to his aid, Hunter to pursue the murderer, undoubtedly a native, who unfortunately made his escape in the darkness.⁷

During 1845 and 1846 he is briefly noted in the official records as on leave or waiting orders.

THE ALVARADO AFFAIR

Since men-of-war of that day were, with few exceptions, sailing vessels, our naval operations in the Gulf at the time of the Mexican War were hampered by the lack of steamers. To supply this deficiency the government purchased a number of such craft, among which was the *Bangor*, built in 1844 on the Delaware to ply between Boston and Bangor.⁸ She was an iron paddle wheeler of only 230 tons, armed with one small gun and carrying a crew of but 50 men. Renamed the U. S. S. *Scourge*, she was sent early in 1847 to Vera Cruz under the command of Lieutenant Charles G. Hunter, who was directed to report to Commodore Matthew C. Perry, then the commander-in-chief of our naval force in Mexican waters. The speed of this tiny boat may be inferred from the fact that she was 12 days making the passage from New York to Havana where she spent two or three days, probably for coal and provisions. A man of Hunter's energy would not tarry unnecessarily on his way to the seat of war. We can imagine his disappointment on reaching Vera Cruz the very day, March 28, 1847, it was surrendered. However, an opportunity for service against the enemy offered itself immediately. How well he profited by it!

Some 30 odd miles to the southward of Vera Cruz lies the town of Alvarado at the mouth of the river of the same name. At the time of which we are writing it was so heavily fortified as to be looked upon, next to Vera Cruz, as "the Gibraltar of the Gulf."⁹

Twice during the previous year it had been attacked by our ships-of-war. On both occasions the latter were beaten off. These failures had created a great deal of dissatisfaction in the United States and an ardent longing in our fleet to retrieve a defeat. Its capture was furthermore desirable because at Alvarado was a large number of mules and horses much needed by the army in its contemplated advance on the city of Mexico.

⁷ Parker's "Recollections of a Naval Officer."

⁸ *San Francisco Argonaut*, January 29, 1916. Niles' Register, May 15, 1847.

⁹ *Philadelphia Public Ledger*, May 19, 1847.



LIEUTENANT CHARLES HUNTER.



Between General Scott on shore and Commodore Perry afloat a joint expedition was at once planned against Alvarado. General Quitman, with a brigade reinforced by the 4th Regiment artillery, was to march overland and cut off the retreat of the enemy, whom Perry was to shell out of the town. The scheme was sound. There seemed to be no likelihood of its not being carried out most successfully to the great glory of Perry and Quitman.

How important this enterprise was deemed at Vera Cruz is seen in the following extracts from Vera Cruz letters of the day:

General Scott has shown great promptitude in following up his victory. A sufficient force to take Alvarado was immediately despatched under General Quitman.

Commodore Perry, with some of the smaller vessels of the navy, was to sail down to Alvarado to co-operate with General Quitman's brigade, and if resistance was made to attack the place by land and water.¹⁰

Since Perry's heavy ships were sailing vessels he ordered Hunter to proceed in advance and "watch the port." What Hunter actually did is told by a lieutenant of Perry's flagship, the frigate *Potomac*, William H. Parker, who, in his "Recollections of a Naval Officer," gives us this story:

As we approached the bar, we saw that something was wrong as the vessels were all under weigh instead of being at anchor. Very soon the *Albany* hailed us and said that Alvarado was taken. "By whom?" asked our captain. "By Lieutenant Hunter in the *Scourge*" was the reply. And so it was. Hunter, the day before, had stood in pretty close and observing indications of *flinching* on the part of the enemy, he dashed boldly in and captured the place almost without firing a gun. Not satisfied with this, he threw a garrison, *consisting of a midshipman and two men*, on shore and proceeded in his steamer up the river to a place called Tlacotalpan which he also captured.¹¹

When General Quitman arrived with his brigade and the place was gravely delivered over to him by Passed Midshipman William G. Temple, he was greatly amused and laughed heartily over the affair.

The accounts say that when the fleet got down to Alvarado, and Lieutenant Marin with five men to garrison a town and seven forts, delivered the command of them to Commodore Perry, all the officers and men in the squadron were convulsed with laughter, and their roars induced the inhabitants of Vera Cruz to believe Alvarado was bombarded.¹²

The following is Hunter's own account of the affair, and the articles of capitulation of both the towns captured:

¹⁰ Vera Cruz letters, summarized in the *Pennsylvanian*, April 13, 1847.

¹¹ Parker's "Recollections."

¹² *Philadelphia Public Ledger*, April 29, 1847.

U. S. STEAMER "SCOURGE"

ALVARADO, April 2d, 1847.

Sir: I have the honor to report that on the afternoon of the 30th ultimo, at about 5 o'clock, I arrived off the bar of this river; that I immediately opened upon the forts with round shot and shell; but finding a heavy surf on the bar, and seeing indications of a norther, I stood off and on during the night. In the morning I again opened on the forts, when I discovered a white flag on the beach, and, shortly after, the captain of the port and a pilot came off with a flag of truce, offering a surrender of the place, and informing me that the Mexican troops (to the number of three or four hundred) had, after our attack, evacuated the forts and city the night previous, having first fired all the government vessels, spiked a portion of the guns, and buried others in the sand. With a view of preventing any further destruction of public property, or a return of the Mexicans before your arrival, and for the purpose of securing an unobstructed entrance for the squadron, I came in, anchored off the town, received their surrender, (a copy of which I herewith enclose) hoisted the American flag under a salute of twenty-one guns, and then, hearing that the garrison of the place were hastening up the river with two or three vessels loaded with arms, ammunition, and other public property, I left Passed Midshipman Temple, with five men, in command of the place, and stood up the river after them. On the way up I succeeded in capturing four schooners; one I burned, as I could not get her off; another I left behind as worthless; the third I towed down; and the fourth is now coming down under the command of Passed Midshipman Pringle. At 2 o'clock in the morning I anchored off Fla-co-Talpam, a city of about 7000 inhabitants, sent Lieutenant Marin ashore to the alcade, assembled the junta and demanded an entire and unconditional surrender within half an hour. My demands were at once complied with, and I herewith transmit a copy of their surrender.

I am, &c.

(Signed) C. G. HUNTER, Lt. Comnd'g.

To Commodore M. C. Perry, Commander-in-Chief of the Gulf Squadron.

THE TERMS OF CAPITULATION

TOWN OF FLA-CO-TALPAM, 1st April, 1847—2 o'clock A. M.—

Present, the constitutional Alcalde and citizens who compose this illustrious council on the one side, and on the other Captain C. G. Hunter, of the United States steamer *Scourge*, accompanied by the second lieutenant of that vessel, M. C. Marin; the object being to enter into such negotiations as shall be suitable for the welfare of the inhabitants, and better understanding with that nation, the terms expressed in the following articles were agreed to by both parties:

First.—The town of Fla-co-Talpam hereby declares its perfect neutrality towards the forces of the United States, and also its entire submission to them as long as existing circumstances continue.

Second.—In consideration of this, the said Captain, in the name of the government, whose commission he holds, binds himself that the right of

individuals shall be respected, as also their persons and private property likewise the Catholic religion, and the free exercise of its forms of worship.

And for the fulfilment and faithful observance of this compact, both the contracting parties hereby bind themselves by all the forms usual; and in testimony of the same, they have hereby subscribed their names to two copies of this contract, each of the same tenor and date. Done by the Alcalde, presiding officer of this council, and the before-named second lieutenant, who assisted in arranging this negotiation, and who is commissioned to sign for the before-mentioned Capt. Charles G. Hunter.

(Signed) PEDRO ATALPICO

M. C. MARIN, Lieut. U. S. N.

The town of Alvarado having been left defenceless, surrenders itself to the United States steamer *Scourge*, Captain C. G. Hunter, on the following conditions:

First.—That the forces of the United States will respect and protect the Roman Catholic religion.

Second.—That they solemnly guarantee complete and entire protection to the inhabitants of this town, and all species of property, it being distinctly understood that no public edifice or private house shall be taken or used by the United States forces, unless some previous arrangement shall have been made with the owners.

JOSE RUIZ PARRA,

President of the Council.

M. C. MARIN,

Lieut. U. S. Navy.

ALVARADO, 31st March, 1847.

A newspaper of that time says:

We can imagine the feelings with which Commodore Perry must have surveyed his squadron of vessels and the military force on shore, all set forth in the pride and puissance of war to take the town of Alvarado, which had been already taken by a single vessel without firing a shot. Had Commander Hunter not converted the blockade into an attack, and permitted the land and naval forces to come down upon, and reduce the city, the credit would have been given to the imposing force, and another laurel leaf would have graced the chaplets which Perry and Quitman wear. But as it is, the vessels lie quietly off the town, which the *Scourge* has taken, or have proceeded North, and Gen. Quitman having marched far enough to find his intended work done to his hands, has quietly marched back again.

It may be proper, but we think Commodore Perry should have mentioned how Alvarado was taken and not permit the impression to go to the department that the combined forces reduced the city. Commander Hunter's name is not mentioned, and it deserves that for the gallantry of the act, at least, even if he is under arrest for transcending orders.¹³

The foregoing paragraphs give the facts in the case. To compare them with Commodore Perry's official report which follows

¹³ *United States Gazette*, April 24, 1847.

makes one marvel how so big a man as he really was could have descended to such a level of spiteful pettiness:

UNITED STATES FLAG SHIP "MISSISSIPPI."

ANCHORAGE ANTON LIZARDO.

April 4, 1847.

Sir: I have the honor to inform the Department that immediately after the surrender of Vera Cruz, General Scott and myself concerted measures for taking possession of Alvarado. Although it was not expected that any defence would be made, it was thought advisable that strong detachments, both of the army and navy, should be employed, in view of making an imposing demonstration in that direction. The southern brigade under General Quitman was detached for this duty, and the naval movements were directed personally by myself [*sic*]. As it had been anticipated, not the slightest opposition was offered by the enemy, and the river and town were quietly occupied on the 2d instant by the combined forces of the army and navy. (!)

General Quitman took up his line of march this morning, on his return to Vera Cruz, and I left for this anchorage to arrange an expedition to the north; Captain Mayo, with a small naval detachment, being placed in command of Alvarado and its dependencies, in which may be embraced the populous town of Tlacotalpan, situated about twenty miles up the river.

In this expedition I have had the good fortune to become acquainted with General Quitman and many of the officers of his command, and have been gratified to observe a most cordial desire, as well with them as with the officers of the navy, to foster a courteous and efficient co-operation.

The enemy, before evacuating the place, burnt all the public vessels, and spiked or burned most of the guns, but those that were concealed have been discovered, and I have directed the whole number—about sixty—either to be destroyed or shipped, with the shot, on board of the gun boats, as they may be found of sufficient value to be removed.

With great respect, I have the honor to be your most obedient servant.

M. C. PERRY,

Commanding Home Squadron.

The Hon. John G. Mason, Secretary of the Navy.¹⁴

It is a tax on one's credulity to be asked to believe that this report is authentic. The answer may lie in Tertullian's remark, "*Credo quia impossibile est.*" Yet the formal official document purports to describe events in which Perry had no part or lot and it does not even mention the man who had the wit to perceive and the courage to act, who after taking Alvarado pushed up the river some 30 odd miles, anchored off Tlacotalpan in the middle of the night, sent Lieutenant Marin ashore with a peremptory demand that the *ayuntamiento* or town council should meet at once and surrender the place, giving them half an hour for this purpose else would he

¹⁴ *Pennsylvanian*, April 4, 1847.

"open on the town and *order the troops to advance!*" Since he had not a soldier or marine within call, was there ever in all history a more splendid, more audacious bluff than this? Yet it worked to perfection. Having left one midshipman and five bluejackets to hold and garrison Alvarado with its seven forts he left a lieutenant and three seamen to occupy Tlacotalpan with its 7000 inhabitants.

Lest it be thought that this account is exaggerated here are Hunter's letters *in extenso*.

U. S. STEAMER "SCOURGE"

ALVARADO, March 31st, 1847.

Sir: The surrender of the City *must be made* in 30 minutes from this time and *must be* unconditional.

If at the expiration of that time they do not agree to our terms I will open upon the town and order the troops to advance.

(signed) C. G. HUNTER

Lieutenant Commanding.

To Lieutenant M. C. Marin
at the Governor's House
Alvarado.

To be read to the Justices in Council Assembled.

No. 2.

U. S. STEAMER "SCOURGE"

OFF TLACOTALPAM, March 31st.

Sirs: In order to avoid unnecessary bloodshed and in accordance with the spirit and feeling of civilized nations, I demand in the name of the United States of America an entire and unconditional surrender of the town of Tlacotalpan.

I have the honor to be, Sirs,

Yours &c,

C. G. HUNTER.

To the President and Ayuntamiento
of the City of Tlacotalpan.¹⁵

And what reward did Hunter receive for these magnificent services worthy of a Cushing? He was court-martialed! Incredible again, but true. The official record must once more be quoted in proof, and it is only proper that it be quoted in full.

CHARGES AND SPECIFICATIONS OF CHARGES, PREFERRED BY COMMODORE M. C. PERRY, COMMANDER-IN-CHIEF OF THE U. S. NAVAL FORCES IN THE GULF OF MEXICO, AGAINST LIEUTENANT CHARLES G. HUNTER, U. S. NAVY, LATE COMMANDING THE U. S. STEAMER "SCOURGE"

CHARGE FIRST.—Treating with contempt his superior, being in the execution of his office.

¹⁵ Emmons collection.

Specification 1st.—In that the said Lieutenant Charles G. Hunter U. S. Navy, did on the 31st day of March, 1847, being then in the command of the U. S. Steamer *Scourge*, enter the Port of Alvarado, and did there arrogate to himself (the said Lieutenant Charles G. Hunter) the authority and powers that are vested only in the Commander in Chief, by entering into stipulations for, and receiving the surrender of Alvarado and its dependencies.

Specification 2d.—In that the said Lieutenant Charles G. Hunter, U. S. Navy, did on the 31st day of March 1847, with the U. S. Steamer *Scourge* under his command, proceed from Alvarado to the town of Tlacotalpam, without any orders or authority, and there demanded the surrender of the said town of Tlacotalpam, and enter into and sign articles of capitulation, although aware of the immediate approach of the Commander-in-chief, to whom alone such powers are confided, thus treating with contempt the authority of his Superior Officer being in the execution of his office.

Specification 3d.—In that the said Lieutenant Charles G. Hunter, U. S. Navy, did on the 31st day of March 1847, in proceeding from Alvarado to Tlacotalpam, capture four schooners; one of which he set on fire and burned, and another he abandoned, thus substituting his own will for the discretion of the Commander in Chief, who was within a few hours reach of communication; and treating with contempt the authority of his superior; all of which in violation of the laws of the United States as contained in "an act for the better government of the Navy of the United States, approved April 23d, 1800."

CHARGE SECOND.—Disobedience of Orders.

Specification 1st.—In that the said Lieutenant Charles G. Hunter, U. S. Navy, having been ordered to report to Captain Samuel L. Breese and to assist in blockading the port of Alvarado, did in disobedience or disregard to said orders enter the harbour and take possession of the town of Alvarado.

Specification 2d.—In that the said Lieutenant Charles G. Hunter, U. S. Navy, having been ordered on the evening of the 1st of April 1847, to report himself in person to the commander in Chief, at his quarters in the town of Alvarado, at 10 A. M. of the following morning, did disobey said order. All of which is in violation of the laws of the United States as contempt in "an act for the better government of the Navy of the United States, approved April 23d, 1800.

(signed) M. C. PERRY

Commander-in-Chief

U. S. Naval Forces

Gulf of Mexico.¹⁶

In justice to Hunter's memory and as showing how lofty were his professional principles, how great his respect to his seniors, even to one who had so grossly abused the prerogatives of his office, how plain and straightforward his speech, let us hear what he himself said in his defense against such unheard of charges.

¹⁶ Emmons collection.

Mr. President and Gentlemen of the Court: I will not trouble you with unnecessary verbiage, but proceed at once to the point. My orders were, (as stated in the 1st spec. 2d charge) to report to Capt. Breese, and to assist in blockading Alvarado. I did not consider them (can they be fairly considered?) as forbidding me to annoy the enemy in every way in my power, as modifying in the slightest degree the general duty of every officer having a military command in time of war, to molest and cripple the enemy in every possible way. On the evening of the 30th March, being sufficiently near, I opened upon the fort at Alvarado with shot and shells. Apprehensive of a norther, I stood off and on during the night, with a strong breeze and rough sea. Towards morning, it having moderated, I stood close in to the bar, and again opened upon the forts. Shortly afterwards, I discovered two horsemen upon the beach, holding a white flag, and a boat crossing the bar at the same time. This boat brought me an offer on the part of the authorities to surrender the city. Permit me here to observe, Mr. President, that as there are two sides to every question, so there may be two results to every affair of this kind. Alvarado is now in our possession; but let us suppose that it was not to be: that we had been foiled a third time in our efforts to take it. What would have been my position, I say, if I, having refused the offer of the town when the authorities were ready to yield it—the American forces had been a third time baffled in their efforts to capture it? Mr. President, the worst that can now befall me is a trifle to the infamy and disgrace which would have remained attached to my name, perhaps, long after I was in the grave. If you, Mr. President, (or any member of this honorable Court,) will fancy yourself in my place when the offer of capitulation reached me, I think you must perceive that it placed me in a difficult, a most embarrassing position—one that might have got a much more experienced officer than myself into trouble. I had to decide upon the disobeying of my orders on the one hand, and the possible consequences which my refusal to take such a responsibility might lead to on the other. I had to decide between two courses—the one leading to present personal safety, and the possibility of future infamy; the other to some personal risk, perhaps, but by which the honor of the navy and my honor, at least, were safe. I have stated thus the view which I took of my position, and the motives on which my actions were founded. I will not say, Mr. President, that under similar circumstances you would have taken a similar view of your position; but I think I may say without the danger of dissent, here or elsewhere, that taking the same view I did, you or any other member of this honorable court, would have done just what I did. My summons for the surrender of the city of Alvarado, was not made until the authorities hesitating to sign the articles of capitulation, I thought myself entrapped, when it became necessary to use strong measures and strong language. Upon the reception of that summons, they signed the articles, and in the name of the United States of America, I took possession of Alvarado and its dependencies. Shortly afterwards, I learned that after our attack the evening previous, the garrison had fired the public vessels, spiked and buried their guns, placed a large quantity of government property, chiefly munitions of war, on board of several small vessels,

and were proceeding up the river in the direction of the city of Fla-co-Talpam. I followed, as I conceived it to be my duty, and captured one of them loaded with arms, &c., that got ashore, and burned her to prevent her falling into the hands of the enemy. Another, worthless to ourselves or the enemy, and abandoned, and two others, I brought to Alvarado. The pursuit of these vessels led me to the city of Fla-co-Talpam, where I arrived about two o'clock in the morning; trusting to the suddenness of the attack, I ordered the junta to assemble, and demanded within thirty minutes an entire and unconditional surrender, and my demands were complied with. I contend, Mr. President, and gentlemen of the court, that all that happened after the capitulation of Alvarado, followed as a natural and necessary consequence, (not, however, foreseen by me,) when I first accepted their offer to surrender. I contend that my error consisted in the original disobedience of my orders, (which, from what I have since learned, I regret,) and that what I did afterwards, I was in a great measure obliged to do. Knowing that several small vessels of the enemy, laden with military stores, were within my reach, could I doubt that it was my duty to destroy or capture them? Seeing, from the conduct of the enemy at Alvarado, that a panic prevailed among them, and that there was a prospect of success, I demanded the immediate and unconditional surrender of Fla-co-Talpam. I contend that these two acts followed as a necessary consequence to my first disobedience of orders. Of the motives that led to that step, I have made a honest exposition to the Court, and I hope that you will consider them, together with the difficulties of my position, and my want of experience in such matters, as some palliation of my fault. I regret my error, apart from the trouble it has brought upon me. I regret it, because it has given offence to the commander-in-chief. (I speak from rumor only—I have no certain knowledge of the fact,) as I have heard that was an understanding between the commander-in-chief and the commanding general ashore, that there was to be a combined attack made by the squadron and army, on these places; it might thus seem that I had sought to rob of its just participation in this affair that arm of the service which in the progress of this war, has acquired for itself and for our country, so much honor and glory. Nothing could be farther from my intentions—I knew nothing of any such understanding. One or two matters remain to be touched upon. I am charged in the two 1st spec. of the 1st charge, with arrogating to myself the powers of commander-in-chief, in signing articles of capitulation, &c., although aware of the immediate approach of the commander-in-chief. In regard to the first, my error was one of simple ignorance. I knew that I had obtained possession of these places, and meant of course to hand them over to the first senior officer that might approach; but I had not the remotest intention of exercising any of the powers of commander-in-chief. I knew, or perhaps I should rather say had reason to believe, that the commander-in-chief would arrive in a short time; but I did not know precisely when, still less did I know that he was nearer than Vera Cruz.

In the 2d specification of the 2d charge I am charged with having disobeyed an order to call at a specified time at the commander-in-chief's quarters.

Gentlemen, I was so absorbed by the difficulties that surrounded me, that his order to me to report myself, entirely escaped my recollection—this may seem a lame excuse, but it has at least the merit of truth. But, Mr. President, none of us are entirely free from occasional acts of forgetfulness; the honorable member yesterday who gave in his testimony, made a mistake, and I must say that the confidence with which I leave my case in his hands has been increased by the handsome manner in which he corrected his error when reminded of it.

Mr. President and gentlemen of the Court, I have been much mortified and excited, by the many and numerous difficulties that surround me. I have aimed at nothing but the glory of my country—the honor and dignity of the service to which I belong. I leave my case with perfect confidence in your hands.

C. G. HUNTER, Lieut. Comdg.

It is difficult to believe that in spite of these manly words he was found guilty of all the charges, except that of not reporting to Captain Breese, preferred against him. He was sentenced "to be dismissed the squadron" and reprimanded by the commander-in-chief, the reprimand "to be read on the quarter-deck of every vessel of the squadron, in the presence of the officers and crew." With what zest must the latter have performed his part in this regrettable affair may be inferred from his own letter to Hunter.

U. S. FLAG SHIP "MISSISSIPPI"

ANTON LIZARDO, April 9, 1847.

Sir: I inclose herewith the findings and sentence of the Court Martial convened for the 7th instant for your trial, which imposes upon me the task of expressing in the form of reprimand, my opinion of your conduct as proven before the Court. However lenient the sentence in your case may seem to be, I have approved of it, as I can conceive of no punishment more severe than a dismissal from a Squadron actively engaged before the enemy.

The sentence while it condemns in a most signal manner your conduct, cuts you off from further association in this Squadron with men whose partial endurance of the most trying duties, and whose character for courage, obedience, and subordination have won my highest approbation.

How different has been your course. Scarcely a day on the Station and you disobey orders, arrogate to yourself the duties belonging to a Commander in Chief, talk of opening upon the Town, and of ordering the Troops to advance when you had but one Gun, and not a solitary soldier, and all "for the purpose (as you say) of securing an unmolested entrance of the squadron" into the River. It would be difficult if not impossible to point to another instance of similar folly, and the most charitable construction that can be given to it, is that in the elation of a first command you have truly enjoined yourself actually in command of the Naval and Military

departments then approaching and within a short distance of the scene of your Exploits.

With due Respect,

(signed) M. C. PERRY

Commanding Home Squadron.¹⁷

To Lieut. Charles G. Hunter
U. S. Navy.

The reader will note the concluding expression of this astounding document "with due Respect."

It is not necessary to contend that a navy held in such leash as the irate Perry prescribed would lose all initiative and become practically valueless—nor to hold, had Perry summoned Hunter and after congratulating him upon one of the most gallant deeds in our naval history, had said, "My dear Hunter, don't you think that next time you might leave something for me?" that he would have had in Hunter a passionately devoted subordinate ready to go through fire and water for his chief.

As it was, Hunter was sent home in disgrace, ruined and embittered for life. From the effects of this colossal injustice he never recovered. How indeed could he? The writer believes that much of his subsequent misfortune may be fairly ascribed to the outrageous treatment he received off Alvarado.

AFTER ALVARADO

During the weeks succeeding this tragic episode the newspapers at home printed full accounts of it, for the most part rejoicing in a glorious, an almost unique, victory and condemning Perry in unmeasured terms for his misrepresentations, his unfounded claims to a personal participation and for his shocking punishment of an unusually gallant and energetic subordinate. Some, however, agreed with Perry. One side of the question was typically expressed by the *United States Gazette* of May 7, 1847, which said that "inferior officers must obey the orders of their superiors, under any circumstances of temptation to do otherwise or the efficiency of the navy or army is at an end." For this paragraph the *Gazette* is rebuked by the *New York Commercial Advertiser* in the rejoinder that

the spirit of all instructions was complied with by the very act of going beyond the letter. Nelson thought so; Taylor thought so; though neither of them might have suspected that the delay proposed was for anything but prudence, not for the purpose of transferring laurels. . . . The Commo-

¹⁷ Emmons collection.

dore rests under the suspicion of having envied the Lieutenant . . . the little glory of conquering a town, and not allowing him, the Commodore, to come and take the glory of a victory which he had not achieved, for which he was not prepared and of which he should have been willing that some other person should have the glory.

Lieutenant Hunter is the theme of general remark and censure. . . . A little more of the spirit in the Navy he has displayed would do it no harm and might add much to its efficiency in the present war.

The general sentiment throughout the country was that Hunter was a hero and Perry wholly in the wrong. Nor are Perry's supposed motives spared. The Washington correspondent of the *Philadelphia Ledger*¹⁸ writes:

The reprimand of Lieutenant Hunter by Commodore Perry is, I can assure you, as much commented upon here as in Philadelphia and other places. It is looked upon as extremely ill-natured and wholly unwarranted by the circumstances of the case. Alvarado was, next to Vera Cruz, looked upon as the Gibraltar of Mexico, and the taking of it, with one gun, has turned the whole formidable expedition against it into ridicule. This it is for which Commodore Perry lectured him. . . . He . . . destroyed all the glory which would have attached to the laying siege to or taking of the place by storm; he accomplished by a *coup de main* what had to be the result of scientific arrangement and execution; and hence his act of unparalleled "folly." Every disobedience of orders, however successful, must be punished, but there is no necessity for dipping the rod in vinegar! That is a luxury which ought not to be indulged in in time of war.

Much indignation also was felt among Hunter's colleagues in the navy who could not be indifferent to this humiliation inflicted as the consequence of dash and courage. So to punish the latter sapped all the springs of naval daring. One officer writes home, This treatment of as gallant an officer as ever trod deck, for performing as gallant an act as could well be conceived, and with a success which makes his conduct entirely justifiable, will never receive the sanction of President Polk.¹⁹

Unhappily for Hunter nothing was ever done to right the wrong under which he labored, and the sanguine writer of the foregoing lines wholly misjudged the President.

Hunter was sent home, broken in spirit, to arrive at Norfolk May 25, 1847, a passenger in the U. S. S. *Ohio*.²⁰ Proceeding thence to New York,

He was received at the American Hotel with cheer after cheer by the enthusiastic crowd which assembled on learning his arrival. The people are

¹⁸ May 19, 1847.

¹⁹ *Pennsylvanian*, May 8, 1847.

²⁰ *United States Gazette*, May 28, 1847.

always just—they know how to reward a gallant action, and sweep technicalities aside when they interfere with strict justice."²¹

Hunter was indeed the idol of the hour. Escorted to the Governor's room at City Hall by a large concourse of citizens, he was presented with "a costly sword." Dinners were held in his honor, swords were given to him, and he was known as "Alvarado" Hunter to his dying day. A deputation of his fellow townsmen of Trenton received him at the railway and under military escort conducted him to his dwelling, whence in the evening a procession, civic and military, was formed which marched to the court-house where, with appropriate ceremonies, was presented to him a silver pitcher "in testimony of his gallant conduct."²²

All these manifestations of public favor failed to salve the wound inflicted upon his proud spirit. From the day of his unjust punishment his downfall began to proceed slowly but surely to the end. "Poor Hunter, his fate was a sad one after all. Soon after his arrival at home his friends got him the command of the schooner *Taney* and in her he made a sort of roving cruise in the Mediterranean. He was not allowed a purser, and being extremely careless with his accounts found himself heavily involved upon his return to the United States. His friends came to his assistance and succeeded in getting him another command." So says Parker in his "Recollections." That this shortage involved no moral turpitude on his part and was due to inattention to duties of a novel description may be assumed, since Congress was easily persuaded to make good the deficiency in the government funds placed in his hands.

After a long period on waiting orders he was once more employed afloat. In 1853 he was given the command of the brig *Bainbridge* and sent to join the Brazil squadron under Commodore William D. Salter.

While Hunter's life was marked by many unusual happenings, the last episode is so extraordinary in character that it can only be explained on the ground that his mind had become unbalanced. So far as can be ascertained these are the facts in the case.

A difficulty of some kind had arisen at Asuncion, Paraguay, between the local authorities and the American Consul. Hunter,

²¹ *Philadelphia Public Ledger*, May 29, 1847.

²² *Niles' Register*, August 14, 1847.

who was nothing if not impetuous, begged Salter to let him go to the scene in the *Bainbridge* and help straighten out the matter. For reasons not given Salter refused the request. Not unlikely he feared that Hunter would be as much out of place in a diplomatic embroglio as a bull in a china shop. Chafing under this rebuff and irritated by Salter's unreadiness to exert pressure where pressure seemed to him needed, Hunter when next sent on a cruise deliberately squared away for home and deserted the squadron, something no really sane man could have done. Arriving at New York early in January, 1855, he issued an address in his defence to the American people.

The defence was characteristic of the man. "Vessels of war," he said, "are sent abroad for the sole purpose of protecting the lives, property and rights of our citizens; and any man who would consent to remain in command of a vessel of war where her use was perverted, *i. e.*, sent where she was not needed when great necessity existed for her elsewhere, would be acting unworthy of his position."²³

The offence was too flagrant to be condoned and President Pierce ordered his name to be summarily stricken from the rolls. On January 29, 1855, he ceased to be an officer of our navy.²⁴

After his dismissal he took up his abode in Philadelphia. The failure of his hopes and his great misfortunes weighed heavily on his mind, his hair became rapidly grey with grief and all his acts betrayed him to be a broken-hearted man.²⁵

As might have been expected, he did not long survive his degradation. He was admitted to "The New York Hospital" February 28, 1856, as suffering from a disease contracted in Mexico during the war and there five days later his soul sought and found a peace he had not known on this earth.²⁶

He is said to have left a wife and daughter who at the time of his death were in Spain.

The writer, having made earnest but hitherto unsuccessful efforts, will be glad to have from any source information which will enable him to get in touch with Hunter's descendants (if any there be) or with other relatives of his.

²³ *Pennsylvanian*, March 7, 1856.

²⁴ Navy Department Records.

²⁵ *Pennsylvanian*, March 7, 1856.

²⁶ *New York Times*, March 7, 1856.

Hunter's life was full of romance, the tragic element prevailing. It is impossible to review it without experiencing a melancholy regret that so much talent was wasted partly through his own fault, partly through the fault of others. His finer qualities were too fine not to have been better utilized.

In a brief obituary, a writer in the *Pennsylvanian* of March 7, 1856, says that

no one who knew him had any but feelings of respect for him. His faults, if they were faults, were errors attributable to an impulsive disposition, and were far outweighed by his manly and solid virtues. He was as generous as brave, and impetuous. His melancholy demise will be regretted by all who knew him, as well as by those acquainted with his singular and romantic career.

The highest tribute to his ability is that of his colleague and squadron mate, Lieutenant W. H. Parker, who in his "Recollections" stated that Hunter "was one of the best naval officers of his day." Notwithstanding his faults and errors which were both many and grave, to look upon his end as it really was and to imagine what it might have been, had he not been so shamefully treated by Perry, makes one hope that never again shall such cruelty be inflicted on a gallant sailor, that for all time the one historic victim of unpardonable official injustice in the navy of the United States may still remain the intrepid "Alvarado" Hunter.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE EXECUTIVE OFFICER

By RICHARD WANE

The executive officer of the *New Mexico* was John Drake. When his orders were issued, there was considerable surprise that so young an officer should receive so important a billet. In fact, Drake himself was quite as much surprised as any one. He had expected to go to the battleship fleet as navigator of one of the ships, or possibly as gunnery officer. That he would be ordered to the very latest ship to go in commission as executive officer had not even entered his mind. As the two-year period of shore duty approached its end, he realized that once more he must break up his household in preparation for a three-year tour of sea duty. As inspection officer at Mare Island Navy Yard, he had become known to even the poorest paid workman as the most exacting man that had ever filled that position. The officers in charge of the manufacturing plants found themselves confronted with more rejected work during the first month of Drake's incumbency than they had had during a year of his predecessor's. There were a good many protests, of course, and a good many arguments, but no end of rejections, in spite of them. Costs mounted up. Also the manufacturing departments became more alert and careful. Then there was better work, costs went down again, workmen were discharged and leading men shifted. The rejections became fewer and fewer. Within a few months, Drake had accomplished a great deal for efficiency's sake, and the efficiency became steadily greater. But it makes enemies to disturb the routine; and while the various department heads recognized that much good had been accomplished, they were not sorry to see Drake go to sea.

The commandant's wife was at home. The veteran of more female wars than the commandant was of real wars, she had now arrived at that enviable social position as the first lady of the

navy yard. She no longer made a first call on new arrivals, for according to the dictates of custom, even newcomers must pay a first call on the commandant's wife. Her afternoons at home were always well attended. Every lady came, unless prevented from so doing by something extremely serious. True, they enjoyed themselves, but it was strategically fatal to absent oneself. Something must be discussed and it was much more comfortable to be present.

Mrs. Green, the constructor's wife, denied herself the refreshment table, a martyr to a new found cause of labor. She sat in a rocker, under a spreading palm, manipulating her knitting needles with intense application.

" eight, nine, ten Yes, dear Oh! heavens, I've lost my stitches one, two, three yes, they say there is such a shortage of officers for the fleet that they are sending almost any one, even to the most important positions."

Mrs. Drake, nearby, heard the remark, and knowing that it was intended for her ears, would have liked to remark that probably the constructor's shops would welcome a change of inspectors. However, what she did say was, "Are you piping the collar in yellow, Mrs. Green? It's going to look so pretty."

"I'm so glad that you think so, my dear. I was thinking of using white, but, you know, it soils so easily."

All of which has very little to do with the story, except to show that when there are so many people to please, there are some who simply can't be pleased.

When an officer leaves his shore duty, he gives up his house and all that goes with it. His stateroom on board ship, sometimes hardly large enough for one, is supposed to take its place. Such incidentals as one's family have no standing in official circles. There was the packing to do. It would seem that a navy woman would become philosophical after a while and take moving as a matter of fact. But she doesn't. For her, each move has its heartaches, and its fears. In her treasures, each object has its associations and its memories of glorious trips or sordid ones to little boarding houses in the days when her husband's pay was small.

It was hard for Mrs. Drake to take down the first picture. With many a sigh, she gathered them up, and once the shock of the bare walls had passed, she went bravely at her task. Down

came the camel's-hair drapes John had purchased in Colombo, when the battleships had gone around the world. Among her possessions, too, was the cherished set of Canton china—every navy woman but the newest untravelled bride has her set. She wrapped each piece herself and packed it carefully in the very same barrel which had carried it there two years before. The tags from the army transport still stuck to the barrel's sides.

During the packing, the storekeeper's clerk came to check the furniture list, even to the garden hose and the iron ash-bucket.

When Drake came home for his lunch, they ate at a bare table in a still barer room.

"You will have to stay in Vallejo with the children," said Mr. Drake, "that is, until I send for you."

"But," protested Mrs. Drake, "your ship doesn't sail for several months yet, and I thought that we were going with you. It will be so hard to be alone after we have been together for so long."

"I know, dear, but I will have no time for you or the children at first."

His wife knew that if John Drake had decided that she must remain behind, it was useless to try to dissuade him. She had tried it before, but his decisions on domestic matters of major importance had always stood, and, as a matter of fact, had always turned out for the best. So she told him gently that she thought he knew best, and went to the window to hide a tear that would not stay back. Down at the entrance of the channel was the familiar dredger and she wondered idly if she would be able to see it from Vallejo. It was a part of the scenery, working day and night, week in and week out, fighting a draw with the silt of the Sacramento River, that a congressman might say proudly to his constituents, "See I am keeping our payroll intact. You must return me to Congress."

Drake lost weight the first few weeks on the *New Mexico*. Hard work and little sleep made their impression on his face. The ship must be ready to leave the yard at the time set. There were innumerable details to attend to, and new officers to get acquainted with and assigned to duty. A week before the time set for leaving the yard a little man with steel-grey eyes and a close cropped grey mustache came on board carrying a small satchel. To the officer of the deck he announced that he was Captain Smeed and he had come to report for duty and to take

command. His arrival, very indefinite—they understood that he was on leave of absence—had been expected daily. For over a week the morning orders had stated that the officer of the deck would keep a lookout for the captain. The officer on watch had thought at first that he was another of the vast army of solicitors to see the paymaster, but a more experienced officer would have recognized the penetrating gaze of the arrival as too characteristic of the navy to leave any doubts as to his identity.

Drake escorted him to his cabin, and a few minutes later the captain, in uniform, read his orders to command to the assembled crew. With the executive he inspected the ship, asking sharp questions, demanding to know whether this matter had been attended to, whether such a thing had been received on board. The tone of his voice boded ill for a negative reply. Those who knew Captain Smeed said that he was a martinet, and he was known by many. Intolerant of excuses, exacting in the performance of duty, quick tempered and nervous, he was held in fear and respect by those who had served under him. By those above him, he was regarded as a good man for the job.

There was the usual shaking down cruise, during the latter part of which a watch officer forgot to report eight o'clock to the captain. He was suspended from duty, reducing the watch to six. A boat left the ship three minutes behind schedule. The watch was reduced to five. An air of nervous expectancy permeated the wardroom. It got to be a frequent thing for the orderly to come into the messroom at lunch time. The captain wished to see Mr. Drake. When Drake returned to his lunch, the speculation and conversation would cease abruptly, and those nearest him would notice that his face was flushed and tense.

Always a quiet man, Drake would have nothing to say on these occasions. But from day to day his manner changed. The watch officers complained to each other that he supervised their duties with more attention than was necessary. Of an afternoon, after a night watch, when they had tried to take a nap, they were sent for, to be told about something of minor importance. When they had asked for permission to leave the ship they were asked about something or other which delayed their leaving. The paymaster thought that he knew his business pretty well and aired his grievances in the doctor's stateroom. That sage individual advised him to take his troubles to the captain, but after starting for the cabin, the paymaster thought the better of it and whirled about on his heel.

When the gunnery officer had asked for a special boat to take him ashore he was referred to the boat schedule. Down in the junior officers' messroom, the favorite subject was the executive officer. With the freedom of youth, they heaped invectives upon his head, and picked out different jobs for themselves on other ships.

If John Drake knew that he was not popular with the officers of the ship he did not show it. From early morning until after sunset he plodded away in his office or walked about the decks. After lunch or dinner, he would leave the messroom and smoke alone in his stateroom while he worked.

Down in the wardroom, Wadsworth, the senior watch, shook some tobacco violently from a little sack, closed it with his teeth, and spread the tobacco carefully in the hollow of the paper.

"It's a great life if you don't weaken," licking the paper along its length. "Boy, bring me a match! Where is that confounded boy? These boys are the limit. What they need is a few mid watches toeing a seam on the deck. Push the button, Cort."

Some minutes later Antonio Felipes, his black pompadour neatly brushed and highly perfumed, made his appearance.

"What in the blazes makes you so slow? You are not in the bosque eating rice out of banana leaves now, you know. You are in the great American Navy."

"De duktor he send me por his estuard."

"Well, you will be sending por de duktor, if you don't move a little faster," threatened Wadsworth.

"Woody," laughed Cortland, "you are getting irritable. Climate affecting you maybe."

"Climate nothing. My goat is walking abroad in the land."

"I would say that some one had corralled it, had tied it up and was feeding it tin cans."

"I guess you are right, and that some one has got about every-one's goat in his corral too."

"And here you are passing it right down the line. Regular little P. D. L. you are. What is the trouble this time?"

"Mid watch last night and not a bit of sleep before it. Of course I slept like a log this morning and who should pass through the messroom at 8.30 but little bright eyes, who invited my attention to the fact that the tables had to be cleared by 8.30 and would

I please arrange to get my breakfast more promptly in the future. Oh, this is the life!"

"Shouldn't let a little thing like that bother you. We are all getting it. Why last night, I, Lieutenant Cornelius Cortland, junior grade—for all time I guess—late commanding officer of the U. S. S. *Pampanga*, senior officer present, Southern Archipelago, was told to wear my cap, when I ventured on deck to the movies without it. How have the mighty fallen!"

"And I, Lieutenant Squirt McDougal," chirped up a little fellow in the corner, "lately detached from my soft job at the navy school on the Spa, with the rest of the mob—I, the mighty Squirt, famous shortstop on the Plebe baseball team, I got mine too."

"And what did the little runt do?" gleefully enquired Wadsworth.

"The little runt as you choose to call him, you ragged beanpole, was three minutes late in reporting his division this morning. Naughty! Naughty!" and he slapped his wrist derisively.

There was some comfort, at any rate, in knowing that the other fellow had received his share of attention; and, besides, talking things over with the other victims soothes the hurts to one's pride.

Of the captain they saw but little. At mast in the morning, he would fix his eye-glasses slowly to his nose, and with his head bent over the report book, he would gaze over the top of his glasses at the sailorman up for trial. After repeating the man's explanations with understanding and sympathy, to the complete satisfaction of that person, and be it said to his complete deception, he would snap out that he did not believe a word the man had said, and deliver upon him a punishment that made even the reporting officer wince at its severity.

At the first battle practice of the ship, the officers did their work through no desire to augment the fame of their captain, or add to the laurels, if there were any, of their executive officer. Relentlessly drilled and trained, they went to their stations on the day of the practice determined to do their best, because that was the way every officer of the navy was supposed to do his duty. As a matter of fact, they were not very optimistic over the outcome. For the most part, censure had been their portion and praise had not been known. The executive had that morning

told them that their men were not scrubbing their hammocks properly. And this on the day of target practice!

After the firing was over, it was whispered that the executive had stood behind the captain and when the latter had given the order to commence firing had quietly asked him to cancel the order. So surprised was the captain, that he did so, demanding to know the reason. Drake explained to him that under the rules, he did not have to fire until the ship had closed in another thousand yards and that he thought that the captain had known. Whether it was the thousand yards, or not—it certainly must have helped—there were 12 counted hits radioed from the towing ship. The captain tried to be affable, but he did so with difficulty. Certainly he was pleased, for this was undoubtedly the best shooting that had been done, with only three ships yet to fire. As for Drake, he sat down to lunch with his acquired reserve, and answered with monosyllables to the conversation of those about him.

For a new ship the *New Mexico* had done exceptionally well, and the captain knew that he would be among those present when the Selection Board next met. He offered his boat to the officers if they wished to go swimming, and warned several men at the mast instead of punishing them—something of a novelty to the men. It was noted that his orderly of late seldom appeared in the wardroom at lunch with the quiet summons. And it was noted that the executive appeared on deck less often to ask the officer on watch why he had not attended to some matter with more attention to detail. But for the most part he kept to himself, smoking more than he should have, talking to no one except on matters pertaining to duty. He understood in a vague sort of way that the officers regarded him in an unfriendly light.

There came an end to the drills and the maneuvers. It was over—all the hard work of the winter months in Cuba. The next day the fleet would sail for the north. Boats were secured for sea, gun shutters closed and all but one gangway taken in.

As Drake stood looking towards the shore line, the thought of his family awaiting him in the states caused his face to relax. The pleasure of anticipation was not to be denied him. To-morrow they would be at sea, and Fisherman's Point over there would be lost in the distance. The cable station with its lonely little family of three would be no longer under the big guns of the fleet.

As he gazed in that direction, a motor boat put off from the shore, and made for the gangway of the *New Mexico*. In the boat Drake recognized the superintendent of the station and his wife. With them was a lad of eight, and he noticed when they came on board that both the little fellow and his mother had been crying. He met them at the gangway, and in a few words was told by the father that the admiral had authorized the lad's passage to the states where he was to be placed in school under the care of an aunt. Drake looked over the permit and told them quietly that he would see that the boy was made comfortable on the trip.

The little fellow clung to his mother and manfully tried to hold back the big tears which filled his eyes. The mother gathered him in her arms and cried softly. The father, too, was filled with emotion as he said good-bye to his son.

"It's for the boy's good, mother, so you must not take it so hard." Turning to John Drake, who was gazing over the side, but seeing nothing, he said, "I trust, sir, that you will be kind to my boy. He will miss his mother very much and will be very lonesome."

"I shall do my best for the lad," Drake answered, and turning to the mother, "I have two boys at home, one about his age, and you may rest assured that he will be well taken care of."

With a final embrace the mother and father went down the gangway and into the little boat. Waving their hands as long as they could be seen, they looked longingly at the big ship that was taking their son so far away from them. They saw John Drake at the head of the gangway, the little fellow's hand clasped tightly in his, both waving their farewells to the little boat until it passed from view.

"Now let's take a look at the big guns," said Drake, "and by the way, what is your name?"

"John," answered the boy simply.

"Well now, isn't that splendid? That is my name, too. I think it's a pretty good name, don't you, John?"

The boy swallowed a big lump in his throat that would not stay down, and dashed a tear quickly from his eyes.

"Yes, sir."

"Short names are best, you know. Then the boys can't give you nicknames. Now when I was a little fellow like you"

"But my daddy says I am a big boy now," objected the boy.

"Why of course you are. But what I meant was that I was littler than you are when I was little. See?"

"Yes, sir."

"Well when I was little there was a boy who lived near me, whose name was Sylvester. The other boys called him Sylvest at first and then they called him Syl. One day one of the boys called him Silly and that was the only name he was ever called after that."

The little boy laughed and said he thought that Silly must be a very funny name to have when one grew up. The tears disappeared, and the natural interest of a child in new surroundings asserted itself. He asked a great number of questions which John Drake carefully answered. Hand in hand, they walked the deck, the boy talking with animation, Drake smiling and talking quietly to the lad.

"This is to be your home for the next few days, John," he told him, as they entered the executive's stateroom. "We will just take all of those things out of the top drawer now and put your things in there. How will that be?"

"That will be fine, sir, and Oh! look at the elephants," spying a herd of ebony elephants on the desk top. There was a very large one and a very small one and many sized ones between these two. Drake took them down, one by one, and gave them to the boy, who promptly sat on the deck and stood them in a row.

"And here is a camel to join the herd. But first I must wash the ink out of him."

"Do camels have ink in them?"

"Just this one. He was made to hold ink. All the real camels are full of water."

"Tell me about them, please," promptly demanded little John.

So John Drake sat on the edge of his bed and told the child all about camels and deserts and caravans. It was a long story, and when it was finished, the child asked to be told all about elephants. So Drake told him a tale of elephants and jungles that held the child in spellbound interest.

Over their cigars and their pipes, after dinner that evening, the wardroom officers talked of their plans for New York. Blue drifts of tobacco smoke floated over the messroom; the pianola pounded forth a syncopated Broadway hit; over in the corner, the doctor pondered over a chess board with the paymaster;

while at the other end of the table the chief engineer, with a pack of cards spread over the table, played his nightly game of solitaire.

At one end of the messroom, a Filipino boy spread clean sheets over a transom, folded the blanket on the foot and beat out a pillow.

"Better put some chairs alongside that transom," suggested the paymaster, "the boy might roll out."

But after the lights were out, John Drake came from his room in kimono and sandals and retired on the transom. Each night at sea he slept there, and when it was rough, he placed the chairs against the sides of the narrow transom to prevent his rolling out. On occasions, when the rough weather would awaken him he would go to his stateroom to take a look at the little boy lying asleep in the big brass bed.

Wadsworth went to the executive's stateroom to make a report the day before their arrival in New York. He looked through the partly opened curtain and saw the boy sitting on the deck, building a house with wooden blocks, which Drake had asked the carpenter to make. Close to him, on his knees, was John Drake, handing the blocks one by one to the child. Both were laughing, for the boy was having great fun.

"I don't want to go to school, Mr. Drake. I would like to stay right on here and be a sailor. Do I have to go to school? Why can't I stay right here with you? We could have so much fun. I would like to be on a ship with you all the time."

Drake looked at the boy and asked, half to himself, "Would you, John? I wish that others felt the same about it. But I guess they don't understand."

Wadsworth did not deliver his report. Instead, he turned quietly about and tiptoed down the ladder to the wardroom.

"You fellows, come over here a minute, I want to tell you something." When they had gathered about him, he talked earnestly to them for a long while and when he had finished they nodded their heads in assent.

"Woody, I guess you are right, we have considerable parallax in our visions and it has been getting worse. Our opinions need boresighting, too, I guess," said Cortland, in the vernacular of the navy.

When they sat down to dinner that night, with the little boy in his usual place next to Drake, there was less conversation than

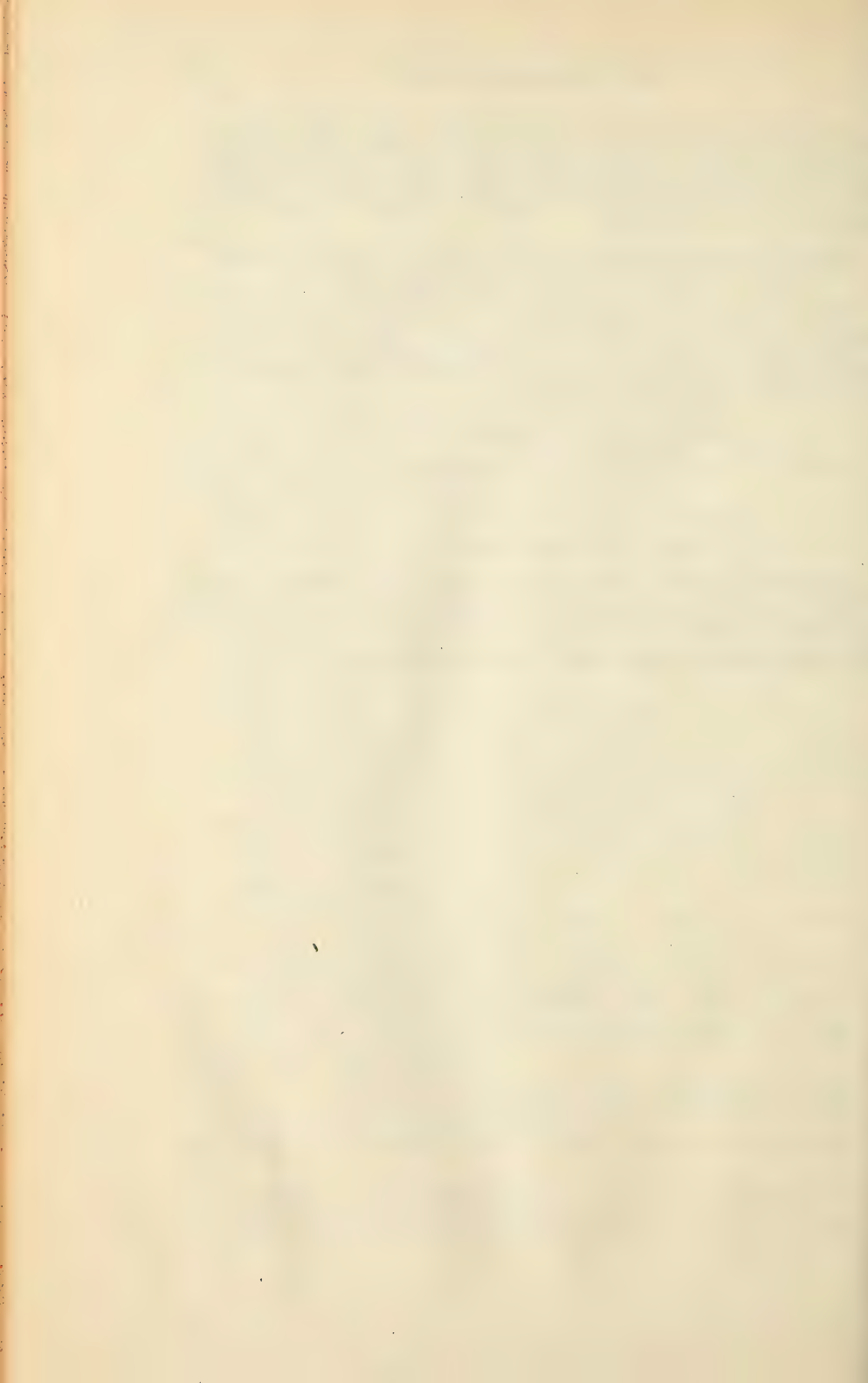
usual. As the officers ate, they cast an occasional, expectant glance towards the center of the table. Presently Wadsworth tapped his fork against his water glass several times. A silence settled over the messroom.

Again he tapped the glass with his fork. "Ah-h-h," he sang. "Ah-h-h," chorused the officers in the same pitch.

Then Wadsworth started singing and the others followed, until every voice had joined the chorus. Away down in the junior officer's mess and even in the captain's cabin above the words of the song could be heard:

With a neat Ha Ha, sweet Ha Ha,
Handsome and fair.
He is a corker, the girls all declare.
He's a high rolling lollydob swell.
Here's to JOHN DRAKE!
Say DON'T he look well?

The song had died down. At the end of the table sat John Drake, a great look of bewilderment on his face. Recovering his surprise, he smiled. It was a smile of great peace and happiness. He was amongst friends again. They understood.



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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE CAREER OF THE MEXICAN GUNBOAT *TAMPICO*¹

By J. H. KLEIN, JR.

THE MUTINY

At the beginning of the year 1914 there were three Mexican gunboats on the west coast of Mexico, namely, the *Guerrero*, *Morelos* and *Tampico*, all under Federal control.

On February 22, 1914 (Sunday), at Guaymas, Mexico, about 8 p. m., while about half the officers and men were ashore, the executive officer (Lieutenant Malpica), the paymaster (Rebatet), and two engineer officers (Johnson and Estrada) took charge of the crew of the *Tampico*, arrested the captain and the chief engineer, and announced that the *Tampico* would henceforth be under the control of the Constitutionalists, or Rebels. The captain and the chief engineer were told that if they made no resistance they would not be harmed, and would, at the first opportunity, be turned over to the Federals. The mutiny, therefore, was accomplished without violence or bloodshed.

The *Tampico* immediately left Guaymas and stood to the northward intending to ram the *Guerrero*. Fortunately for the *Guerrero*, the *Tampico's* steering gear broke down and she then turned around to the southward and proceeded to Topolobampo, arriving there on February 24. The captain and the chief engineer were then placed aboard the S. S. *Herrerias*, and sent to Mazatlan, which at that time was in Federal hands.

¹ Nothing has heretofore been written concerning the career of the *Tampico* except the official reports from vessels stationed on the western Mexican coast at that time. It was my intention at first to compile an official report of her operations, but the tale seemed so interesting that the "compilation" gradually became a "story." The official reports of Admiral T. B. Howard (commander-in-chief), Commander G. B. Bradshaw (commanding *Yorktown*), and Commander N. E. Irwin (commanding *New Orleans*) were consulted and the data derived therefrom were used in producing the following story which is of historical value because of its accuracy.

The exact cause of the mutiny is not known. Various vague stories have been circulated concerning the true reasons therefor, but no one seems to know which, if any, of these may be true. One story has it that the Federals owed the crew 4000 pesos. Another story was told to the effect that Malpica had strutted the streets of Guaymas with a lady of questionable character (some say she was the captain's mistress) and as a punishment the captain sentenced Malpica to be reprimanded and to perform temporary duty with the army at the front. In order to avoid this sentence he was said to have hatched out the mutiny. By common repute the *Tampico* had been a very "gay" ship in her day, and I was told that frequently week-end parties had taken place at which both sexes were present aboard ship for several days at a time.

OPERATIONS AT TOPOLOBAMPO

On March 2, 7 a. m., the *Guerrero*, commanded by Capitán de Navío Torres, arrived off Topolobampo from Guaymas, and anchored outside the bar. At 10.30 a. m. the next day the *Morelos* arrived from Mazatlan, and anchored near the *Guerrero*.

At 9.37 a. m., March 4, the *Tampico* was observed standing down from Topolobampo. The *Guerrero* immediately got under way and opened fire as she entered the channel. The *Morelos* got under way as soon as practicable and followed along astern of the *Guerrero*. As soon as the *Tampico* cleared Shell Point she returned the *Guerrero's* fire, whereupon the *Guerrero* stopped, backed out of the channel, and presented her broadside to the *Tampico*. At that time the *Morelos* was about 800 yards beyond the *Guerrero* away from the *Tampico*. The firing continued until 10.05 a. m., during which time the *Guerrero* fired about 20 shells, the *Morelos* about six, and the *Tampico* 14, at a range of 8000-9000 yards. The firing of the *Guerrero* and of the *Morelos* was very wild. Comparatively speaking, the *Tampico* fired fairly well. Of her shots one was spotted 50 yards short, one 50 yards over, and one slightly to the left. At the conclusion of this brief engagement, the *Tampico* returned to Topolobampo and the *Guerrero* and the *Morelos* anchored outside, off the bar. No damage was done to any of the vessels. At that time the *Tampico* was said to have had about 70 tons of coal and about eight hundred 4-inch shells remaining on hand. At 8.40 p. m. the same day the *Morelos* left for Guaymas to coal and provision, returning to Topolobampo on March 9.

On March 13, at 8.50 a. m., the *Tampico* again stood out; the *Guerrero* and *Morelos* getting under way as soon as possible. The *Guerrero* opened fire at 9 o'clock. As soon as the *Tampico* cleared Shell Point, she opened fire on the *Morelos*, her first shell landing about 20 yards short, range 9000-10,000 yards. The *Morelos* returned the fire and began retreating to the southwestward, on which course she would have put the U. S. *New Orleans* in direct line of fire between herself and the *Tampico*. The *Tampico* then shifted her fire to the *Guerrero* and the *Guerrero* adopted the tactics of the *Morelos*. The *New Orleans*, of course, shifted berth as soon as possible. All firing ceased at 9.12, the *Guerrero* having fired 13 shells, the *Morelos* nine, and the *Tampico* six, at a range of 9000-10,000 yards, and no hits were made. It was again noted, however, that the gunnery of the *Tampico* was considerably better than that of either the *Guerrero* or the *Morelos*. The *Tampico* returned to Topolobampo while the *Guerrero* and *Morelos* anchored outside of the bar considerably to the southward of their previous anchorage. The *Morelos* left for Altata on March 30.

At 4.32 p. m. on March 31, the *Tampico* was again reported standing out. The commanding officer of the *Guerrero*, who was at that time returning an official call on the captain of the American cruiser, quickly returned to the *Guerrero* and got her under way immediately. The *Guerrero* took up a position off the channel broadside toward the *Tampico*. About 5.30 p. m., when the *Tampico* had reached a position abreast Shell Point, she opened fire on the *Guerrero* at a range of 9000 yards, and was immediately answered. About 6 p. m. the *Tampico* headed straight for the *Guerrero*, going right on over the bar until she grounded below the entrance. By 6.15 she managed to get off the bar and headed northwest, straight for the *Guerrero*. The *Guerrero* retreated but continued firing. At 6.30 the *Tampico* came about and headed back toward the harbor. Both vessels ceased firing at 6.40 because of darkness, the *Guerrero* anchoring off the bar while the *Tampico* proceeded on inside above Shell Point. During this engagement the *Tampico* fired both her 4-inch guns and one 6-pounder, while the *Guerrero* used her six 4-inch. The firing on both sides was very wild. The range varied from 9000 to 2000 yards. The *Tampico* fired about 160 shells (4-inch and 6-pounder) and the *Guerrero* fired 162 4-inch shells, of which 20 were shrapnel and the rest armor-piercing. Malpica later on told one of our officers

that the *Tampico* had been hit seven times during this fight, as follows: Two 4-inch shells passed through the officers' quarters under the poop, one 4-inch shell hit amidships near the water-line, four 4-inch shells entered the bow, one of which struck below the water-line and the other three hit near the water-line. There were no injuries to her personnel. The hits were stated by Malpica to have been made during the period while the *Tampico* was swinging around on the bar. Later on it was discovered that the *Tampico* had sunk inside the channel above Shell Point. The *Guerrero* was struck three times during this engagement; one 4-inch shell, armor-piercing, entered the starboard side of the berth-deck but did not explode, one 6-pounder landed on the skid frames amidships but did not explode, while another shell, either a 4-inch or a 6-pounder, cut a stanchion on the bridge. None of the crew on the *Guerrero* were killed, but a few suffered minor injuries. On April 10 one of our officers inspected the *Tampico* and reported that she was aground, heading out, inside Shell Point on the south side of the channel with water covering her entire main-deck. The two 4-inch guns were still aboard as was one of the 6-pounders in the waist, all the other guns having been sent ashore for use with the army. She still had 600 rounds of 4-inch ammunition left, most of which was under water.

On April 2, during the forenoon, the *Morelos* returned from Altata. The Federal gunboats did not know, but they shrewdly suspected, that the *Tampico* was aground, so, in order to find out, the *Morelos* was sent in close to the bar. At a range of 8000 yards she fired 11 shells at the *Tampico* and the *Tampico* fired eight in return, with no damage on either side.

On April 9 an aeroplane came out of Topolobampo and dropped five bombs near the *Guerrero* and *Morelos*, one of which fell close to the *Guerrero*. Small-arms were used in an endeavor to drive off the aeroplane, but because of her height this fire was not effective.

Later on in the month the Federal gunboats, having discovered the true situation of the *Tampico*, withdrew to other ports.

The *Morelos*, while in Mazatlan harbor, attempted to run well up into the inner harbor, and in doing so, ran high and dry aground. There she lay between the besieged Federals within the town and the Rebel besiegers around the outskirts until she was completely shot-up and destroyed by *both* sides.

The *Guerrero*, in the meantime, steamed up and down the coast between Guaymas and Mazatlan wherever she was needed.

The officers of the *Tampico* were making every endeavor to raise the ship, and put her in serviceable condition. A diving suit was finally procured, the holes under water plugged up, and eventually the ship was raised.

EVENTS PRIOR TO THE FINAL BATTLE

On June 11, 1914, the *Tampico* was reported as having been raised and made ready for sea. The commander-in-chief of the Pacific fleet (Admiral Thomas B. Howard, U. S. N.) was then off Mazatlan in his flagship *California* (now the *San Diego*). Several destroyers were kept with the flagship ready for dispatch duty. On Sunday, June 14, 1914, he received a report that the *Tampico* had that day sailed from Topolobampo. Fortunately for me, my boat (the *Preble*) was ready for a run, so I was detailed to find the *Tampico* at sea and then trail her. The *Preble* immediately got under way (about 3.30 p. m.) from Mazatlan, and started northward toward Topolobampo. The destroyer *Perry*, then at La Paz, was ordered to head for Topolobampo and report by radio to the *Preble* for further instructions. As I did not know what course or speed the *Tampico* was making, I simply proceeded slowly (about 10 knots) overnight to Topolobampo in the hopes of sighting her about daylight the next morning. During the night I twice headed to the westward to investigate passing ships. This set me about 10 miles to the westward of my original course. About 7.30 a. m., June 15, another ship was sighted on the port beam (to westward), hull down, and masts hardly visible. This vessel finally proved to be the *Tampico* herself. Had I not been set to the westward in looking over the two steamers during the night I would not have had the good luck to find the *Tampico* so quickly. Her position then was Lat. 25° 14' North, and Long. 109° 07' West.

I approached to within about two miles of her, and stopped. She also had stopped. As she did not get under way I approached to a position about a mile abeam of her in order to get a closer view, when I saw her lower a boat which headed toward the *Preble*.

The officer in charge of the boat (Rebatet) came aboard, presented the compliments of his commanding officer, and told me the following tale;

The *Tampico* had been under water about two months; she was raised, and thought to be ready for sea. On Sunday, June 14, she left Topolobampo under one boiler and proceeded to sea en route to Altata, Mexico. There she expected to retube her boilers and improve the condition of her machinery, and then start out after the *Guerrero*. After destroying the *Guerrero* she would break up the commerce on the west coast of Mexico, and, by cutting off the supply of provisions at Guaymas and Mazatlan would cause these two main Federal strongholds to fall into Rebel hands. The *Tampico* had proceeded only about 30 miles to sea when her one remaining boiler had burned out and she was now temporarily helpless. He thought repairs could be made, and that by sunset the *Tampico* would again be on her way to Altata. Her complement at that time consisted of the officers mentioned above, the following three additional machinists (Filiberta Vela, Porfirio Gonzales and Floreus Arayo), and about 56 men.

After Rebatet had returned to his ship I withdrew to a position about two miles to the northwestward of the *Tampico*, hove-to to await further developments, and sent a radiocode to the commander-in-chief informing him that I had found the *Tampico*. About 1 p. m. the destroyer *Perry* came in sight, received instructions, and also hove-to.

About 3 p. m. another boat put out from the *Tampico* and came to the *Preble*. The chief engineer (Johnson) and his senior assistant (Estrada) came aboard. They seemed to be in great distress and told me a tale as follows:

They could not repair their boilers; therefore they were at the mercy of the elements and would gradually drift ashore. They requested me to tow them to Altata—about 80 miles distant. (I declined on the grounds of strict neutrality.) They then begged me to send a radio to the American admiral, quoting their request. The captain of the *Tampico* had requested that I come aboard to see him.

I sent the radio to the commander-in-chief as they requested. When I showed them the rough draft of the message in radiocode they were very pleased because they had feared that I might send the message in plain English and that the *Guerrero* would pick it up and discover how helpless they were. And as they could not understand the message, they were certain that the *Guerrero* could not.

About 5.30 p. m. I boarded the *Tampico*. Captain Malpica excused himself for not having called, pointing to the bandages on his left foot. It seemed that about two weeks previously he had accidentally discharged his revolver into his foot, and as a result he could barely hobble about. During my conversation with him I gained a very favorable impression of his ability and determina-

tion. He spoke a little English, and, with my poor scraps of Spanish, we managed to piece out a very fair conversation. He seemed very grateful for my having forwarded his request for a tow to the commander-in-chief, and was anxious for me to inspect his ship thoroughly, to see for myself in what a pitiful condition she was. Accompanied by the executive and the chief engineer, I inspected the ship from truck to keel.

I was most anxious to see her, but as the inspection progressed I became more and more depressed. It was impossible to see such a helpless vessel, completely at the mercy of the wind and sea, totally unfit to steam or remain afloat, much less to commence the unequal struggle with the *Guerrero* which was imminent and inevitable, without a feeling of pity for these poor fellows. Above all, I could not suppress a feeling of admiration for this brave man, which increased at the end of the inspection, when upon asking Malpica what he would do if the *Guerrero* appeared, he defiantly answered: "I'll fight her and sink her if she will only come within range of my guns." These words could only come from either a fanatic or a remarkably determined man.

Conditions aboard that ship cannot be properly expressed in words. The captain's cabin was littered with boxes of stores, provisions and small-arm ammunition. These cases looked as if they had been thrown aboard from a great height and then left scattered, bulged and broken as they fell. The furniture was dilapidated and musty. A steel safe and two magnificent brass candelabra stood among the broken cases. A large quantity of alcohol was said to have been stowed beneath the captain's cabin. The officers' quarters were in the same sad condition.

Out on the main-deck was strewn every imaginable variety of splinter-producing litter. Broken cases, bales of hay, ammunition boxes, and Lord only knows what not scattered all about. Among it all, three cows sauntered aimlessly around assisting in messing up the decks.

Four 6-pounder semi-automatic guns had originally been installed in the waist. All these guns were now missing, and only the broken pedestals remained.

On the skid-beams overhead were the pulling boats which were a long way from being seaworthy or clean. The radio shack, a wooden house about 5' by 5' by 8', was also mounted overhead between the boats. The ship carried an aerial, but there were no radio instruments aboard. Had a shell exploded among these

boats the fragments and splinters would have killed or injured every one on the main-deck. The bridge was a small, rickety affair. On the port side a small machine gun had been temporarily mounted. About 30 boxes containing the loaded belts for this gun were piled about on the bridge.

The *Tampico* had a raised deck forward and aft, on each of which was mounted a 4-inch rapid-fire gun. The officers said that these guns were unreliable, and that they expected trouble with them. A casual examination showed that the breech blocks were loose on their hinges, the rifling badly eroded, and that there was much lost motion in the training and elevating gear. The sights were of a very antique design. Not only did they have much lost motion, but the cross-wires in the rear sight could not be brought to coincide with the front sighting notch. In my opinion these guns were more dangerous to their own crews than to the enemy.

Ammunition was scattered all about the fore-castle and poop. Some of the shells were lying out exposed to the weather and some were still in their boxes. Shrapnel, blind shell, and armor-piercing shell were mixed promiscuously, although there seemed to be more shrapnel than any of the other. As this ammunition had been under water for two months I had grave doubts as to whether it could be fired at all, much less with any degree of accuracy. I was told that they had but 100 rounds of 4-inch shell of all kinds in the entire ship. Inside the fore-castle on the main-deck level were two 6-pounder semi-automatic guns. These seemed to be in fair condition and had an unlimited supply of ammunition. (Only one of these guns could be used in the battle next day as the *Guerrero* did not steam over on the port side of the *Tampico*.)

Below decks the same disorder and dirt was in evidence. Broken wooden fittings were piled up in all corners, a fine opportunity for fire in action. The old shot holes which had been received in previous engagements were plugged up with makeshift leak-stoppers. The officers stated, however, that she was dry and water-tight.

The engine-room was indeed a sorry spectacle. Everything seemed to be rusty and out of commission. The main engines themselves were rusty and filthy, but they had succeeded in going about 30 miles with them at very slow speed. The generator was hopelessly ruined by the salt water, so they had neither electric power nor lights, except kerosene lanterns. Several pumps were said to be in fair condition. The ice-machine was not working,

but of that they had little concern at this time. The evaporator, they said, could be used if they could only get steam from the boilers.

The two Babcock and Wilcox boilers were dead, the fronts of the casings were off, hand-hole plates removed, and many tubes exposed to view. Salt crystals hung from the tubes, the steam piping, the fresh-water piping, and gauge glasses. According to the chief engineer about 500 tubes needed plugging. They were using wooden table legs to make these plugs. Several firemen while hoisting ashes were singing away as if they were really happy. The executive told me that the engineer officers had been in the fire-rooms constantly to tend the steaming boiler, but that during the temporary absence of one of them, the inexperienced firemen had carelessly ruined the boiler. This defection on the part of the engineers was evidently one of the bones of contention aboard the ship, and caused the reprimand of which I shall tell later. The executive said that the engineers' force was composed of five engineer officers and 15 "shovelers" (as he expressed it). It seems that they had no artificers, machinists'-mates, oilers, or water-tenders, and that the "shovelers" were very inexperienced.

The crew were a hard-looking lot of Mexicans. They seemed to be but poorly disciplined, if at all, as during the inspection they swarmed about and would not give gangway to the officers until spoken to very sharply. One of them in fact lolled in a broken-down armchair on the starboard side of the quarterdeck, smoking a cigarette in a most nonchalant manner. Many of the crew wore bandages—evidences of previous engagements. They were poorly clothed, some of them wearing hardly any clothes at all. Inquiries among the various officers as to the number of men in the crew brought answers ranging from 38 to 56. It seems none of them knew exactly how many men were aboard. By checking up the prisoners and wounded I estimated that the crew consisted of:

- 1 commanding officer,
- 1 executive,
- 1 chief engineer,
- 1 assistant engineer,
- 3 machinists,
- 15 in engineers' force,
- 14 in seaman branch,
- 25 soldiers.
-
- 61 total.

After finishing the inspection, I had another conversation with the captain in his cabin. He seemed anxious for a reply to my radio in regard to towing him to Altata, and was disappointed when I told him that I hardly expected one before daylight. Before I left he insisted that I have a drink with him of the vilest liquor I have ever tasted. He seemed loath to have me go, and made me promise that I would come aboard at noon the next day to sample a cocktail for which he claimed exceptional virtues. (The poor man had crossed the line by noon the next day.) I inquired about his supply of food and water and he told me that he could hold out for at least two weeks.

During the night all the vessels drifted in various directions. The *Perry* and *Preble* took position to the westward of the *Tampico* so that in case of any grounding the *Tampico* would ground first and give us a chance to clear out.

About 10 p. m. we sighted a vessel approaching from the southward. She steamed to within two miles of us and then sheered off to the westward. She was probably some coastwise trading vessel, but of this I am not positive. The three ships must have presented a very queer appearance. The *Tampico* was burning several dim oil lamps which could hardly be made out at a distance of one mile. The *Perry* and *Preble* had their running lights on and also the white masthead lights. In addition, being under way, but stopped, we had our red speed-indicator lights on the foremasts burning. A merchantman on coming upon such a combination of lights in a place usually and supposedly clear of all ships, lights, etc., must certainly have been surprised, and I cannot blame her for making a sudden change of course to westward in order to give us a wide berth.

During the night we intercepted a radio from the *New Orleans* (then south of Guaymas) to the commander-in-chief, stating that the *New Orleans* was trailing the *Guerrero* on a southerly course. From her 8 p. m. position I figured that the *New Orleans* and the *Guerrero* would pass us about 7 a. m. the next day. To my mind that information sealed the *Tampico's* fate. We, on the *Preble*, discussed the impending battle, and I am sure none of us slept very soundly during the night. It was a very peculiar feeling to know that the *Guerrero* was bearing down on the helpless *Tampico*, and yet we were unable to inform the *Tampico* of the surprise in store for her. However, my orders were to watch and wait and to report everything, but to assist neither side.

Some time during the night the *Tampico* drifted over a 22-fathom shoal and dropped both her anchors. Her position on anchoring was Lat. $25^{\circ} 28' 30''$ North, Long. $109^{\circ} 18'$ West, and it was there in that position that she was sunk.

About daylight the next morning, June 16, we sighted two vessels to the northward bearing down on us very rapidly. About 5.30 they were recognized as the *Guerrero* and the U. S. S. *New Orleans* (Commander Noble E. Irwin, U. S. N., commanding). The *Guerrero* stopped and cleared for action, and about 7 a. m. stood down toward the *Tampico* to commence the fight.

The *Tampico* hoisted her flag to the gaff—evidently the only preparation they made for action. This flag was an enormous Mexican national ensign, and all out of proportion to the size of the ship. And then commenced the action between the two ships, each flying the *same* national colors.

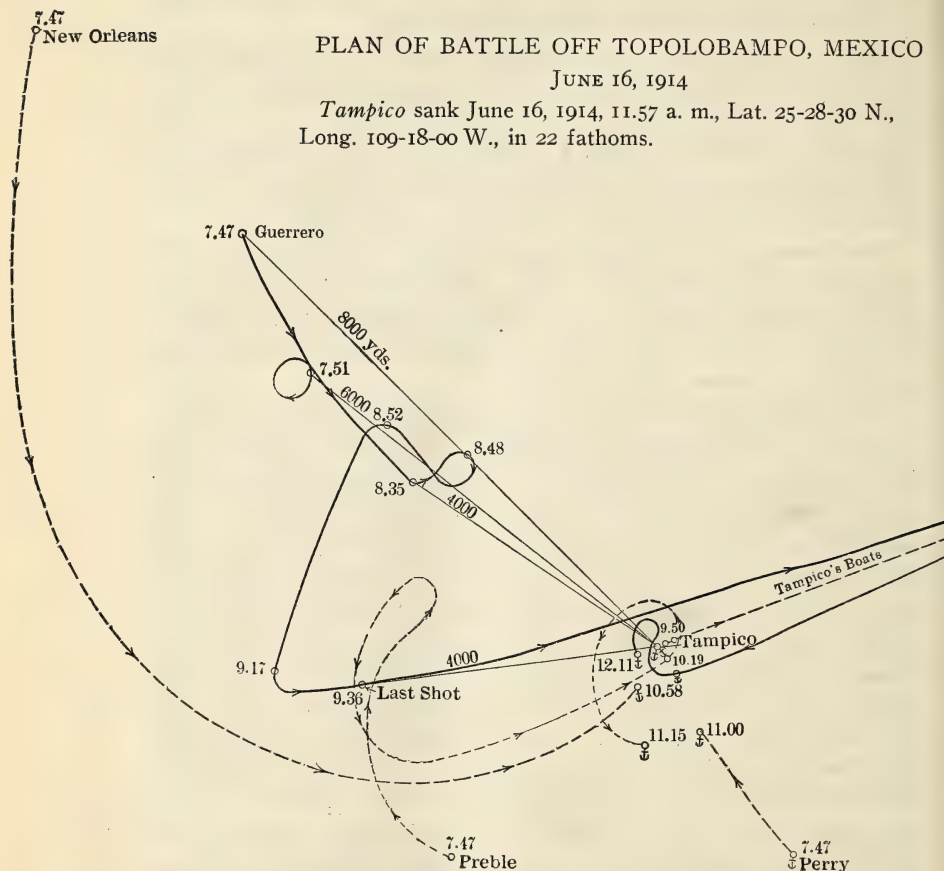
The position of the combatants and spectators at about 7.45 a. m. is shown on the accompanying sketch. The officers and crews of our vessels were very excited, the men swarming all over the topsides and rigging, armed with cameras and binoculars. The majority were in deep sympathy with the *Tampico*, not because they had any real preference for that vessel against the *Guerrero*, but because all humanity unconsciously sympathizes with the "under dog." During the action whenever the shells from the *Tampico* landed near the *Guerrero*, our men cheered, and, conversely, groans were heard when the *Tampico* was hit. The flow of "sailor-man's repartee" was particularly strong, especially when the men criticized the poor gunnery of each side. After the vessels had been "expending ammunition" for an hour or more with little result, the seriousness of the encounter was lost, and much foolish comment was heard. Shells falling beyond the target were called "home runs" while those striking closer were called "triples," etc. On one occasion, when one of the *Tampico's* shells fell about one-third of the way to the *Guerrero*, the helmsman leaned over to the quartermaster and said, "Gee, that wasn't even a respectable bunt," to which the quartermaster replied, "Those boobs on the *Tampico* will starve to death before the *Guerrero* hits her." During the battle the *Preble* ran back and forth midway between the two firing ships, at right angles to the line of fire, and about two miles clear. Whenever the *Guerrero* came about we did likewise, following each of her movements, but being from one to two miles south of her, we interfered in no way.

The weather was ideal, clear and warm, with just sufficient breeze to blow the smoke clear of the guns. The sea was almost dead calm.

PLAN OF BATTLE OFF TOPOLOBAMPO, MEXICO

JUNE 16, 1914

Tampico sank June 16, 1914, 11.57 a. m., Lat. 25-28-30 N., Long. 109-18-00 W., in 22 fathoms.



In order that my impressions of the battle would not later on become confused, I had a yeoman stand near me with a stopwatch, pad and pencil and jot down all the steps of the engagement (I dictated to him as they occurred), noting the time of each event. In this way "imagination" was eliminated.

THE FINAL BATTLE

True to his word, Malpica was the first to begin the engagement, firing his after 4-inch gun at 7.47 a. m. (Mazatlan time) at a range of about 8000 yards. This shell fell 400 yards short. The *Guer-*

rero promptly answered with one gun, the shell falling 1000 yards over. By 7.50 the engagement had become general. The *Guerrero* was using all of her 4-inch guns, while the *Tampico* could use only her two 4-inch and the starboard 6-pounder. Whether the *Tampico* ever fired her machine gun or not is questionable, as the range was never reduced sufficiently to enable the machine gun to reach the *Guerrero*. The firing on both sides was very erratic. There seemed to be no attempt made at spotting. At 7.51 the range was reduced slightly and the *Guerrero* changed course to starboard, *i. e.*, away from the enemy. At 8.02 the *Guerrero* stopped temporarily, the starboard battery presented to the *Tampico*, range estimated about 6000 yards. Between then and 8.11 the firing was very poor. Neither ship had as yet made any hits. Some of the *Tampico's* shells were falling about half way to the *Guerrero*, this no doubt being due either to the defective, wet ammunition or to the failure of the elevating gear. (See story of men, noted near the end of paper.)

At 8.13 both vessels ceased firing for three full minutes, and then the *Tampico* opened again. It was at this time that we noted the manner in which the *Tampico's* guns were being served. It seemed to us that the gun's crew would load the gun and lay it in the general direction of the enemy. Then the men would back away from the gun and lie down flat on deck while some one pulled the firing lanyard. I do not believe that any attempt was made to keep the guns continuously on the target while firing. One officer on the *Preble* stated that he had observed the same procedure on the *Guerrero*, but I saw at various times the pointer at the gun when the *Guerrero's* guns were fired.

At 8.20 the *Guerrero* came about, presenting her port broadside to the enemy. Firing was speeded up, but all shells were falling short. Evidently when they changed course away from the enemy, thereby increasing the range, they failed to change the setting of the sights. About 8.22 the *Guerrero* began easing toward the *Tampico* very slowly and at 8.24 made her first hit—after 30 minutes of firing. This shell struck the main-deck between the mainmast and the poop. A large cloud of white smoke arose, but no damage seemed to have been inflicted, and, as there were no guns in that part of the ship, the *Tampico* did not suffer any reduction of gunfire thereby. This shell was evidently a shrapnel. (Later on I was told that the *Guerrero* had fired practically all shrapnel throughout the engagement.) Firing continued as before, *i. e.*, very slow, and correspondingly ineffective.

Before the fight the *Tampico* had lowered all her boats and had secured them to her port lower boom on the unengaged side. At 8.34 one of these boats got adrift and floated clear of the ship.

At 8.35 the *Guerrero* had advanced to a range of about 4000 yards and then changed course to port, *i. e.*, away from the *Tampico*. This period marks the least range of the entire two hours of fighting. It is probable that at this stage the *Guerrero* was struck. We discovered later that she had been hit twice during the engagement, but as neither hit did any damage we did not know at exactly what time they were made. The *Guerrero* came about at 8.40 and headed for the *Tampico* again, and at 8.48, after one hour of fighting, she scored her second hit. This shell carried away the *Tampico's* gaff and with it went the immense flag previously mentioned. No physical or material damage resulted, but the loss of the *Tampico's* colors no doubt cheered up the *Guerrero's* crew. Two minutes later, at 8.50, the *Guerrero* came about and headed away from the enemy.

During the entire engagement the *Tampico* was at anchor. She however resorted to a ruse which may or may not have gained its end. Oily waste and other combustibles were burned in the smoke-pipe in the attempt to lead the *Guerrero* into thinking that the *Tampico* was actually under way. This could hardly have deceived any one, but it does seem odd that the *Guerrero* failed to steam across the *Tampico's* stern in order to gain a greater danger space for her guns and to reduce the effective fire of the *Tampico* to the lone 4-inch gun mounted on her poop.

The *Guerrero* came about and presented her port side to the enemy at 8.52, at an estimated range of 5000 yards. I noted the firing interval at this stage and found that the *Guerrero* was firing at the rate of two shots per minute (six guns) and the *Tampico* at the rate of one shot every two minutes (three guns). No doubt the *Tampico's* defective ammunition did not fit in the guns, necessitating a waste of a great deal of time in trying to select brass cartridge cases that would go all the way into the chamber and permit the breech block to be closed. Furthermore, as they originally had only about 100 rounds of 4-inch, they may have been trying to save their supply until the *Guerrero* should reduce the range.

Two more of the *Tampico's* boats got adrift at 9.01. The *Guerrero*, at 9.07, probably angered by the long-drawn-out proceeding, headed for the *Tampico* and began to fire salvos. The

mean point of impact was "The Gulf of Lower California" with the distance from the target expressed in "miles" instead of in "yards." One salvo was spotted as 500 yards over, 1000 yards over, and 2000 yards over, and this was a representative salvo. None of the salvos straddled the enemy. This erratic firing provoked much mirth among the *Preble* crew and there were many cries to the *Tampico* to "Soak her now!" The *Guerrero*, still heading for the *Tampico*, slowed down at 9.14 until she barely had steerage way on, and at 9.17 she turned away to port.

After the engagement I discovered that the *Tampico* had been hit in the starboard bow close to the 6-pounder gun, and that the shell had exploded inside the forecastle. That hit must have been made at about this period, but we could not see it from our ship. The forward 4-inch gun did not fire after this, and it is very probable that the exploding shell crippled that gun, possibly destroying its foundations. At 9.18 a shrapnel exploded just short of the *Tampico*, midway between the smokepipe and the forward bridge. This shell did not seem to hurt the ship itself, but the fragments probably killed some of the crew.

At 9.20 flames and smoke were seen to spring from the *Tampico's* quarterdeck. How they attempted to put this fire out I do not know as they had no steam on the ship and consequently would have no pressure in their fire-mains. Incidentally, the alcohol stored beneath the captain's cabin must have given them cause for anxiety. At 9.42 the *Tampico's* gasoline-launch and one pulling-boat came around her bow and secured along her starboard (engaged) side amidships. These boats remained there but a minute and then returned to the port side. Preparations for abandoning ship were evidently in progress. At 9.45 the flames on the *Tampico's* quarterdeck flared up with renewed vigor. Smoke poured forth in large volumes and completely enveloped the after gun. In spite of this the Rebels fired two more shots from that gun, even though I could not see the gun through the smoke and flames. One of the gun's crew stood up on the burning poop and defiantly waved a large flag. The *Guerrero* continued firing until 9.50.

It was then that we saw the *Tampico's* crew in their boats, the gasoline-launch towing one pulling-boat, heading for the shore. After the ship had been abandoned, the *Guerrero* ceased firing and proceeded at full speed for these boats in order to intercept them before they could get into shoal water. The battle proper ends at this time—9.50.

EVENTS IMMEDIATELY AFTER THE BATTLE

After a chase of about half an hour the *Guerrero* caught up with the two boat-loads of the *Tampico's* men. As there was no further hope for the boats to escape they pulled along side of the *Guerrero* and the prisoners were taken aboard. While the prisoners were climbing up the *Guerrero's* ladder, Malpica, standing up in his boat, in plain sight of everybody on the *Guerrero*, calmly placed his revolver to his head and shot himself, dying almost instantly. The *Guerrero* half-masted colors immediately, all the American vessels following suit. The commander of the *Guerrero* sent a radio to the commander of the *New Orleans* thanking the American vessels for half-masting colors "in honor of the death of Malpica." The *Guerrero* returned to a position about 400 yards to the southward of the *Tampico* and anchored. Boats were sent out from the *Guerrero* to the *Tampico* to investigate conditions aboard the latter ship, and a tow-line was passed from the *Guerrero's* stern to the *Tampico's* bow. The rescue party, however, reported that the *Tampico* could not be saved, and later on the tow-line was cut.

When the *Guerrero* ceased firing and started in pursuit of the boats, the American vessels closed-in on the *Tampico*, in order to render such assistance as might be needed; the *Preble*, happening to be the closest at that time, was the first to reach the spot and steamed to within 50 yards of her bow. There were several men rushing about her fore-castle waving white rags. They climbed down the port boom and down the anchor cable, but refused to slide into the water and swim to the *Preble*. In the meantime the fire was spreading and the fixed ammunition was going off in all directions. Small-arm ammunition cracking away sounded like a machine gun. Suddenly the after magazine blew up and 4-inch shells were sent in all directions. Several of these were plainly seen and heard as they flew through the upper rigging of the *Preble*. At this juncture the *New Orleans* appeared and took charge of the situation. She lowered two boats which went close under the *Tampico's* bow and rescued the men who were jumping into the water close to the boats. Later on the *Guerrero's* boats picked up the last man who was floating about on a plank after the ship had sunk. That was Rebatet, the ex-paymaster, severely wounded.

While the *Preble* was close aboard the *Tampico* I noted the following conditions:

The main-deck aft had caved-in and the stern of the ship was a seething cauldron.

The starboard side of the forward bridge was wrecked.

Two corpses were plainly visible on the port side under the bridge.

The main-deck was covered with splintered gear fore and aft.

Shrouds of the mainmast were hanging over the stern.

The foretopmast was pierced, but the stick was still standing.

Gaff and colors were shot away.

Part of the aerial was carried away.

The after 4-inch gun had fallen down into the fiery furnace.

Rolls of paint were hanging from the outer shell aft clear down to the water-line.

The *Tampico* gradually listed to starboard, as the water came up higher and higher. At 11.35 the water had reached the main-deck and began to flow aft until finally it had risen sufficiently high to flow over the hatch coamings and down into the hole in the stern. At 11.57 clouds of steam arose, showing that the water was now flowing into the hole and the end was near. She heeled to starboard sharply, and, at 11.57½, her stern sank very suddenly lifting her bow up to an angle of about 45°. There she held for an instant, the imprisoned air in her bow buoying her up. The air-pressure now began to rip up the planking in the main-deck and spouts of water spurted up as the seams parted. The bow came up vertically, and then, with very little commotion, the ship slid down stern foremost under the surface. There were very few bubbles and no suction. All that remained of the *Tampico* were a few bits of floating wreckage. She sank in 22 fathoms.

About 1 p. m. Captain Irwin called on the commanding officer of the *Guerrero* and took me along with him. We met the captain and the executive officer, and had a short talk with them. They showed us the two holes in the *Guerrero*, which had done no damage to either the ship or personnel. There was no gayety nor any feeling of exultation aboard that ship; on the contrary, a funereal air seemed to pervade everybody and everything. They were very sorry that this battle had had to be fought, and especially regretted the death of Malpica. As they said, Malpica had been respected and admired by all the officers of the *Guerrero*, many of whom had previously served with him. They were profuse in their praises of his courage and ability and mourned his loss as that of a true friend instead of a defeated enemy.

The injured aboard the *Guerrero* were being attended by Surgeon McLean, U. S. N., of the *New Orleans*, assisted by the medical officer of the *Guerrero*.

The captain of the *Guerrero* stated that the prisoners would be treated kindly and I doubted very much if he would turn them over to the Federal authorities when he reached Mazatlan.

REVIEW OF THE BATTLE

The *Guerrero* used six 4-inch guns throughout the battle, and fired practically nothing but shrapnel. We were told that she was endeavoring to fire high in order to kill off the personnel and force a surrender rather than to injure the ship. The *Tampico* used her two 4-inch guns and her starboard 6-pounder, firing common, armor-piercing and shrapnel indiscriminately. The *Guerrero* fired 263 rounds and the *Tampico* 75. The *Guerrero* was struck twice, as previously noted. Her personnel escaped injury.

The *New Orleans* took six men off the *Tampico*, of which two were wounded; one of these died the following day, the other five were taken aboard the *New Orleans* to Mazatlan and, as I understand, eventually transported to the United States. The captain of the *Guerrero* did not request the surrender of these men from the *New Orleans* to the *Guerrero*. Of these six men one was a seaman (second-class), two were petty officers (second-class), and three were privates of infantry (*soldados*).

The captain of the *Guerrero* stated that of the men taken prisoners from the *Tampico* 12 were seriously wounded, and 12 to 15 more suffered minor wounds.

Later on I interviewed these prisoners aboard the *New Orleans*. The two petty officers (Francisco Alvarez, B. M., 2 Cl.; and Aciano Lamos, B. M., 2 Cl.), agreed in their tales, the substance of which is quoted:

Captain Malpica took charge of the after 4-inch gun. The executive (Rebatet) similarly took charge of the forward 4-inch gun. The chief engineer (Johnson) was on the bridge with the machine gun. Throughout the fight the soldiers were a source of considerable trouble, as they did not know the ship and the guns, and had no taste for fighting aboard ship. They were the first to abandon the vessel. The *Tampico* was hit above water five times:

(a) One shell killed two men, Luesa and Salvador.

(b) Another hit did no damage except to carry away the colors.

(c) The third hit killed one *soldado*, and probably was the shell that wounded Rebatet.

(d) The fourth hit killed two men, and seriously wounded Estrada. During the engagement Malpica had rebuked Estrada for carelessness in allowing the boiler to be burned out, telling him that he was the direct cause for the condition in which they now found themselves. Estrada, wounded, went into the radio shack and, with his head between his arms, cried over his reprimand, and died in that position. It was also reported that he had shot himself while in the radio shack. His body sank with the ship.

(e) The fifth hit did no damage.

In addition to these hits, these men claimed there were seven hits in her stern under water. I do not believe it possible that seven shells could have struck there without our seeing some of them as they struck. These shells were said to have exploded in the ship, setting fire to the alcohol and thereby starting the fire which finally caused her to sink. When the ship was abandoned Malpica was the last to enter the boats. These men and the other men who had been rescued by the *New Orleans* had gone below to plug up shot-holes under water. They had been called to come on deck to abandon ship, but they thought there was no special hurry and delayed, and when they did finally come on deck the boats had shoved off. They did not blame Malpica, but took all the blame on themselves for having been abandoned aboard ship.

The elevating gear on the after gun had broken down during the action. The forward 4-inch gun was disabled soon after the firing started. They had fired all their ammunition that was fit for firing before they left the ship and then abandoned because the fire could not be checked and the water was rising in the hold. Before abandoning her the crew opened the sea-valves. To the best of their knowledge, there were only five men (all dead) aboard ship when she sank.

To sum up the fate of the officers and men:

Malpica (commanding) committed suicide.

Rebatet (executive) wounded in chest and leg; found floating on plank; was cared for on *Guerrero*, and probably survived.

Johnson (chief engineer) prisoner on the *Guerrero*, uninjured.

Estrada (assistant engineer) died in the radio shack and body sank with the ship.

Vela, machinist	} Fate unknown; probably prisoners on <i>Guerrero</i> .
Gonzales, " "	
Arayo, " "	

Of the crew, six were prisoners on the *New Orleans*, of whom one died. There were about 48 prisoners on the *Guerrero*, of whom 12 were seriously injured and 12 suffered minor injuries. The remainder, about five, were undoubtedly lost with the ship.

PHOTOGRAPHS

The accompanying photographs are very indistinct. The originals, filed in Office of Naval Intelligence and in the Department, are not much better.



FIG. 1.—*Tampico* (right) and *Guerrero* (left). *Guerrero* returning to *Tampico* after capturing boats. (Photograph taken from the *New Orleans*.)

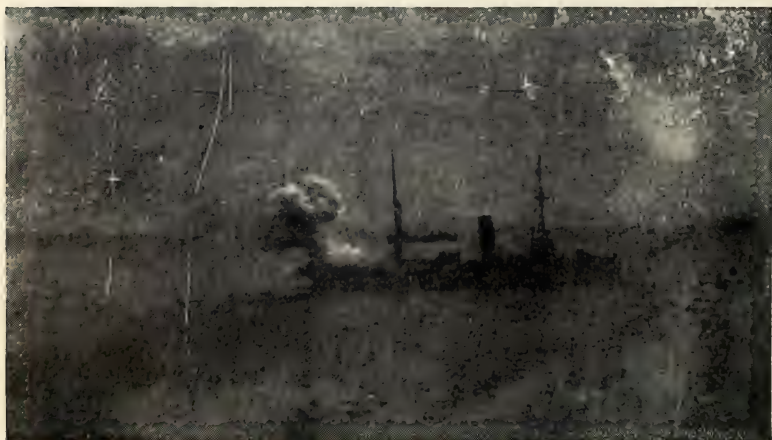


FIG. 2.—*Tampico* afire. Note explosion of ammunition. *Guerrero* on extreme right. *Preble* seen over *Tampico*. *New Orleans'* boats in foreground, one alongside starboard bow, the other on right edge. (Photograph taken from the *New Orleans*.)



FIG. 3.—*Tampico* ablaze. Taken shortly after she was abandoned. *Preble* on left. (Photograph taken from the *New Orleans*.)



FIG. 4.—*Tampico*, view of, close aboard. (Photograph taken from the *New Orleans*.)



FIG. 5.—*Tampico*, view of, close aboard. *New Orleans* on extreme left. (Photograph taken from the *Preble*, just after magazine explosion when the *Preble* was backing away.)



FIG. 6.—*Tampico* sinking. *Preble* on right. *Guerrero's* stern on extreme right. (Photograph taken from the *New Orleans*.)

No. 316-2-328-JHK-WLM.

U. S. S. "PREBLE."

PICHILINQUE BAY, L. CAL., MEXICO.

June 17, 1914.

To: Commander-in-chief, U. S. Pacific fleet.

Via: Commander, torpedo flotilla, Pacific fleet.

Subject: Report of operations.

Reference (a): Flotilla commander's letter No. 705-103 of 6-14-14 and commander-in-chief's first endorsement of same date.

Inclosure (A): Copy of rough notes made during engagement of *Guerrero* and *Tampico*.

1. In accordance with provisions of reference (a), I left Mazatlan at 3.30 p. m., Sunday, June 14, and headed for Topolobampo.

2. During Sunday night I sighted a vessel to westward and pursued her until satisfied that it was not the *Tampico*. I then set a new course toward Topolobampo.

3. At daylight, Monday, June 15, I sighted another vessel to westward which I pursued until I discovered her to be a mail steamer. I then again set a new course toward Topolobampo.

4. About 7.30 a. m., I sighted a vessel to westward which I finally made out to be the *Tampico*. Her position then was Lat. $25^{\circ} 14'$ North, Long. $109^{\circ} 07'$ West. The events cited in paragraphs 2 and 3 are given in order to explain how I came to discover the *Tampico* so far to westward of my original course.

5. The *Tampico* seemed to be under way, so I stopped to southeastward (2 miles) waiting for her to pass. As she did not make any headway, I steamed toward her so as to clear her about one mile to eastward. When almost abreast of her, she lowered a boat which headed toward *Preble*, so I hove-to.

6. The executive officer of the *Tampico* came aboard and from him I received the following information:

"*Tampico* had been sunk at Topolobampo by *Guerrero*, and, after lying under water about two months, was raised and made ready for sea. On Sunday, June 14, 1914, the *Tampico* left Topolobampo under one boiler and proceeded to sea en route to Altata, Mexico. There she expected to retube her boilers and prepare to give battle to *Guerrero*. After proceeding to sea about 30 miles, her one remaining boiler was burned out and she was now temporarily helpless. Repairs would be made and she would proceed to Altata by sunset. Her complement consisted of 56 men and the following officers:

Captain Hilain Rodriguez Malpica (erstwhile executive of *Tampico* while still under Federal control).

Executive officer Augustin V. Rebatet (erstwhile paymaster).

Chief Engineer David Johnson (erstwhile chief engineer), is real Mexican despite his name.

Machinists:

Ramon Estrada.

Filiberto Vela.

Porfirio Gonzales.

Floreus Arayo."

7. After Rebatet returned to his ship I withdrew to a position about two miles to northwestward and hove-to.

8. The *Perry* joined *Preble* at 1 p. m.

9. About 3 p. m., same day, the chief engineer (Johnson) and the first assistant engineer (Estrada) came aboard. They gave me the following information:

"The repairs to the boilers could not be made. The *Tampico* was helpless in regard to her boilers; therefore, she would have to drift ashore. They requested me to tow them to Altata, and when I refused they begged me to wire the commander-in-chief and request a tow, which request was complied with. They invited me to visit their ship."

10. About 5.30 p. m., I went aboard *Tampico*. Their commanding officer excused himself for not calling on me because of a wound in his left foot (where he had accidentally shot himself while cleaning his revolver) and therefore could not walk. In reply to his numerous inquiries I explained to him my mission, assured him that my radios would be sent in cipher, emphasized the fact that I was a neutral and could not therefore assist him in any way as long as his vessel remained afloat, and that I would notify the commander-in-chief of his helpless plight and could do nothing without commander-in-chief's sanction.

11. The commanding officer then presented his officers and requested me to inspect his ship for my own information, which I did and found the following conditions to exist:

- (a) The ship, as a whole, was a mass of wreckage, was dirty, filthy and unsanitary, and the poorest excuse for a man-of-war that could possibly be imagined.
- (b) The captain's cabin was littered with cases of stores, provisions and small-arm ammunition.
- (c) The officers' quarters were in the same condition.
- (d) The main-deck was strewn with every imaginable variety of splinter-producing litter. Three live cows were roaming the decks scattering fodder, etc., all over the ship.
- (e) The four 6-pounder semi-automatic guns which were originally mounted on main-deck were now missing.
- (f) The boats on the skid-beams were unseaworthy.
- (g) An aerial was in position, but the radio house (a wooden shack wounted on skid-beams) contained no instruments.
- (h) On the port side of the bridge was mounted a machine gun. About 30 boxes of loaded belts were scattered about on the bridge.
- (i) Inside the forecastle, where the crew was temporarily housed, I saw two 6-pounder semi-automatic guns, apparently in condition to fire.

- (j) On the forecastle-deck, and on the poop-deck were mounted the two 4-inch rifles. They were said to be very unreliable. My examination showed them to be badly eroded, sights antiquated, breech plugs loose on their hinges, much lost motion in both sight and training mechanisms, and, taken all in all, more dangerous to their own crew than the enemy. Many boxes of ammunition (both 6-pounder and 4-inch) were scattered all about the decks. I noted that blind shell, armor-piercing shell, and shrapnel were promiscuously mixed, shrapnel predominating. Was informed that *Tampico* had about 100 rounds of 4-inch for both guns and an unlimited supply of 6-pounder ammunition.
- (k) Below decks I saw the plugged up shot-holes. They seemed to have been plugged with canvas, redlead and wooden plugs—sorry makeshifts. However, I was told that she was water-tight and all bilges were dry.
- (l) The main engines were badly rusted, but could be used at slow speed. The generator was entirely out of commission, so they had no lights except kerosene lanterns. The ice-machine and many pumps were out of commission. The evaporator was said to be in fair condition. As there was no steam on the ship, I did not see any of this machinery working.
- (m) Both boilers were dead, boiler fronts taken down and hand-hole plates taken off. She had two Babcock and Wilcox boilers. Salt crystals were hanging from the tubes, steam and fresh-water piping and water glasses. I was told that many of the tubes were leaking (about 500) and that they were being plugged with wooden plugs. Table legs were broken up for some of these plugs.
- (n) The crew were a hard-looking lot of Mexicans; quite a few of them were wounded and badly scarred. Some of them wore hardly any clothes. The captain told me that he had but 38 men in his crew including 15 firemen, six seamen, and that the rest were *soldados*. He explained that he had no artificers and that the burned-out boiler was due to the carelessness and inexperience of the 15 shovelers. Had he had a few water-tenders and machinists he would have been able to reach Altata and be properly repaired.
12. Before leaving the ship, the captain said he intended to drift until he reached the shoal and then anchor, and that if the *Guerrero* hove in sight he would engage her even though at anchor, if he could reach her with his guns.
13. During the night of June 15, and morning of June 16, the three vessels drifted to the northwest until the shoal was reached, when the *Tampico* dropped both her anchors. Position, Lat. 25° 28' 30" North, Long. 109° 18' West.
14. At daylight, Tuesday, June 16, I discovered two vessels to the northward bearing down on us very rapidly. These proved to be the *Guerrero* and the U. S. S. *New Orleans*. On sighting us, the *Guerrero* stopped and prepared for battle.

15. The *Guerrero* then advanced in a southwesterly direction until 7.47 a. m. (Mazatlan time) when the *Tampico* opened fire with her after 4-inch gun. Range estimated at 8000 yards.

16. At the time of opening fire, the vessels were situated as follows:

Tampico anchored in 22 fathoms in position Lat. 25° 28' 30" North,
Long. 109° 18' West.

Perry about two miles to southeast of *Tampico*.

Preble under way, about two miles southwest of *Tampico*.

Guerrero about four miles to northwest of *Tampico*, heading southwesterly.

New Orleans about two miles to northwest of *Guerrero*.

17. During the engagement, the *Guerrero* steamed alternately northeast and southwest (approximately), invariably turning to port at each turn. The *New Orleans* steamed around to westward of *Guerrero*, and assumed a position two or three miles southwest of *Tampico*. *Perry* stood to southwest. *Preble* steamed parallel courses to *Guerrero*, keeping at right angles to line of fire midway between the two ships, and about two miles clear of the line of fire. I made a series of rough notes during engagement, appended, inclosure (A).

18. *Tampico* fired first gun at 7.47 a. m., last gun at 9.45 a. m. *Guerrero* fired first gun at 7.48 a. m., last gun about 9.50 a. m. *Guerrero* fired 263 rounds in two hours and two minutes and made four hits, two of which did no material damage. *Tampico* fired 75 rounds in one hour and 58 minutes and made two hits, neither of which did any material damage.

19. When both vessels ceased firing, I headed full speed for *Tampico* and saw three live men on her forecastle waving white rags. These men refused to jump overboard and swim to *Preble*. The after end of *Tampico* was burning very fiercely, and shell and small-arm ammunition were exploding very rapidly. Several 4-inch shells were seen flying in all directions. *Preble* approached within 50 yards of *Tampico's* bow in order to rescue any drowning men. Finally forced to back away because of exploding ammunition. The *New Orleans* later lowered two boats and picked up seven men around *Tampico's* bow. *Preble* remained in vicinity until about 11.30 a. m., then anchored about 800 yards to southwest of *Tampico*.

20. At 1 p. m. Captain Irwin of the *New Orleans* called on commanding officer of *Guerrero* and I accompanied him aboard. Much of the information contained herein was received from commanding and executive officers of the *Guerrero*.

21. *Guns*.—*Guerrero* used her six 4-inch guns throughout, firing practically nothing but shrapnel. The *Tampico* used her two 4-inch guns, and her starboard 6-pounder, firing shrapnel, armor-piercing and cannon shell indiscriminately.

22. *Boats*.—The *Tampico* secured all her boats to her port boom—unengaged side. The *Guerrero* kept all her boats stowed on deck.

23. *Hits*.—The four hits and damage inflicted on *Tampico* are described elsewhere in this report. The *Guerrero* was hit twice, one shell cut a half-moon in her cut-water and caused no further damage. One shell struck her port bow, about 15 feet above water, passed entirely through the ship, piercing several light bulkheads, but did not explode.

24. *Killed and Injured.*—The *Guerrero's* crew escaped without a scratch. The *Tampico* is said to have 10 dead and 10 injured, with the remainder prisoners—seven of which are on *New Orleans*. The commanding officer (Malpica) committed suicide (fired revolver through his mouth) while in his boat alongside of *Guerrero*, as the prisoners were being taken aboard. The first assistant engineer (Estrada) was killed in action. The chief engineer (Johnson) escaped injury entirely and is now on board *Guerrero*. The executive (Rebatet) was picked up by the *Guerrero* while floating away on a plank. The executive of *Guerrero* said something about an injury to Rebatet's left leg, but I could not understand his description of the injury. Of the fate of the machinists nothing could be learned. The commanding officer of the *Guerrero* intimated that the prisoners would be kindly treated and eventually traded. Of the fate of the captured officers nothing was said, but I do not think they will be summarily executed.

25. *Method of Firing.*—The gun crews of *Tampico* were seen to load the guns, then lie down, while some one pulled the lanyard. I do not believe that the guns were sighted and kept on the target while firing. The same procedure was noted on board the *Guerrero* by one of the officers aboard this ship. The wild shooting can therefore be easily accounted for. The firing of the *Tampico* was generally better than that of the *Guerrero*.

26. During the engagement the *Tampico* burned waste, etc., in their turnaces in order to deceive the *Guerrero*. This ruse evidently succeeded in part because the *Guerrero* overlooked the fact that she could have steamed back and forth across the *Tampico's* stern, thus cutting the *Tampico's* fire to the one 4-inch gun mounted on her stern. At no time during all the firing could the range have been much less than 4000 yards, while the mean range was close to 6000 yards.

27. At 2.30 p. m. the *Preble* got under way and proceeded to La Paz, the *Perry* was directed to return to Mazatlan and the *New Orleans* was making ready to follow the *Guerrero* to Mazatlan.

(Signed) J. H. KLEIN, JR.

INCLOSURE (A)

ROUGH NOTES MADE DURING AND IMMEDIATELY AFTER THE ENGAGEMENT
BETWEEN "TAMPICO" AND "GUERRERO" OFF TOPOLOBAMPO,
MEXICO, ON TUESDAY, JUNE 16, 1914

7.47 a. m. *Tampico* opened fire—after 4-inch gun—shell fell 400 yards short.

7.48 " *Guerrero* opened fire—1000 yards over.

7.48½ " *Guerrero* fired two guns—one short and one over.

7.49 " *Guerrero* fired one gun—1000 yards over.

7.50 " Engagement general; estimated range 6000 yards.

7.51 " *Guerrero* changed course to starboard.

8.00 " Shell from both falling from 1000 yards short to 1000 yards over.

Very poor firing, probably no attempt at spotting.

- 8.02 a. m. *Guerrero* stopped, presenting starboard side to *Tampico*; estimated range 6000 yards.
- 8.11 " Marksmanship of both sides getting worse instead of better. Some shells (*Tampico*) falling half way to *Guerrero*. Probably due to defective, wet ammunition.
- 8.13 " Both vessels ceased firing. Reason for silence unknown.
- 8.16 " *Tampico* opens fire again.
- 8.20 " *Guerrero* came about, firing rapidly, presents port broadside, all shells falling short (for her).
- 8.22 " *Guerrero* easing toward *Tampico*.
- 8.24 " Apparently first hit. *Tampico* struck at level main-deck forward of mainmast.
- 8.34 " One of *Tampico's* boats adrift.
- 8.35 " Range estimated 4000 yards.
- 8.37 " *Guerrero* changes course to port, presenting starboard broadside.
- 8.40 " *Guerrero* again heads for *Tampico*.
- 8.48 " *Tampico* struck, shell carries away gaff on mainmast. *Tampico's* colors shot away.
- 8.50 " *Guerrero* heading away from *Tampico*. *Guerrero* firing at the rate of about two guns per minute. *Tampico* firing at rate of about one gun every two minutes.
- 8.52 " *Guerrero* came about, presents port side; range estimated 5000 yards.
- 9.02 " Two more boats of *Tampico* adrift.
- 9.07 " *Guerrero* heading for *Tampico*, firing heavy salvos. One salvo (3 guns) spotted 500 yards over, 1000 yards over and 2000 yards over. Firing erratic. Battle becoming joke.
- 9.14 " *Guerrero* still heading for *Tampico*, but very slowly.
- 9.17 " *Guerrero* turns to port.
- 9.18 " Sharpnel bursts short of *Tampico*. Damage inflicted between smokepipe and bridge along main-deck.
- 9.20 " Flames and smoke appear on *Tampico's* quarterdeck.
- 9.42 " Power launch and pulling-boat on *Tampico's* starboard side—evidently preparing to abandon ship.
- 9.45 " Fire breaks out on *Tampico's* quarterdeck. Smoke envelopes after gun. Rebels continue firing this gun and waving flag.
- 9.50 " *Tampico's* crew abandon her, having set her afire. *Guerrero* heading full speed for *Tampico* and ceasing fire.
- 9.55 " *Tampico's* crew in boats heading for beach. *Guerrero* in pursuit.
- 10.15 " *Preble* close aboard *Tampico*, three live men on forecastle waving white rags. *New Orleans* lowering boats and rescuing men who jumped overboard.
- 10.45 " *Guerrero* picks up *Tampico's* boats and captures crew. All ships half-mast colors.
- 10.50 " *Guerrero* sends boats to land men on *Tampico*.
- 11.00 " *Guerrero's* boats pick up last survivor (discovered later that it was *Rebatet*, the executive).

11.10 a. m. Main deck *Tampico* caves in. Seething caldron in after part of ship.

Following damage noted on *Tampico*:

- (a) Starboard side forward bridge wrecked. Two corpses on port side under bridge.
- (b) Main-deck covered with wreckage and splintered gear.
- (c) Shrouds of mainmast hanging over stern.
- (d) Foretopmast pierced, but topmast still standing.
- (e) Gaff and colors shot away.
- (f) Part of aerial carried away.

11.15 " *Tampico* listing to starboard, sinking gradually.

11.35 " Water up to main-deck.

11.57½ " Water flows in after part (burned out), ship reels to starboard, suddenly stern sank, bow inclined 45°, decks bursting from air-pressure, bow nearly vertical; suddenly all glides under, air bubbles, no suction, little floating wreckage. *Tampico* is no more.

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DISTANTIAGRAPH

By W. D. FARRIS

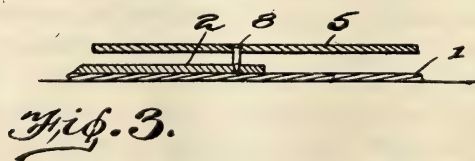
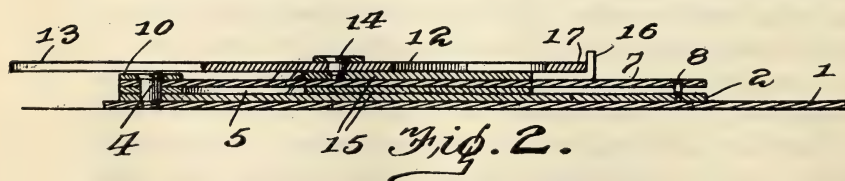
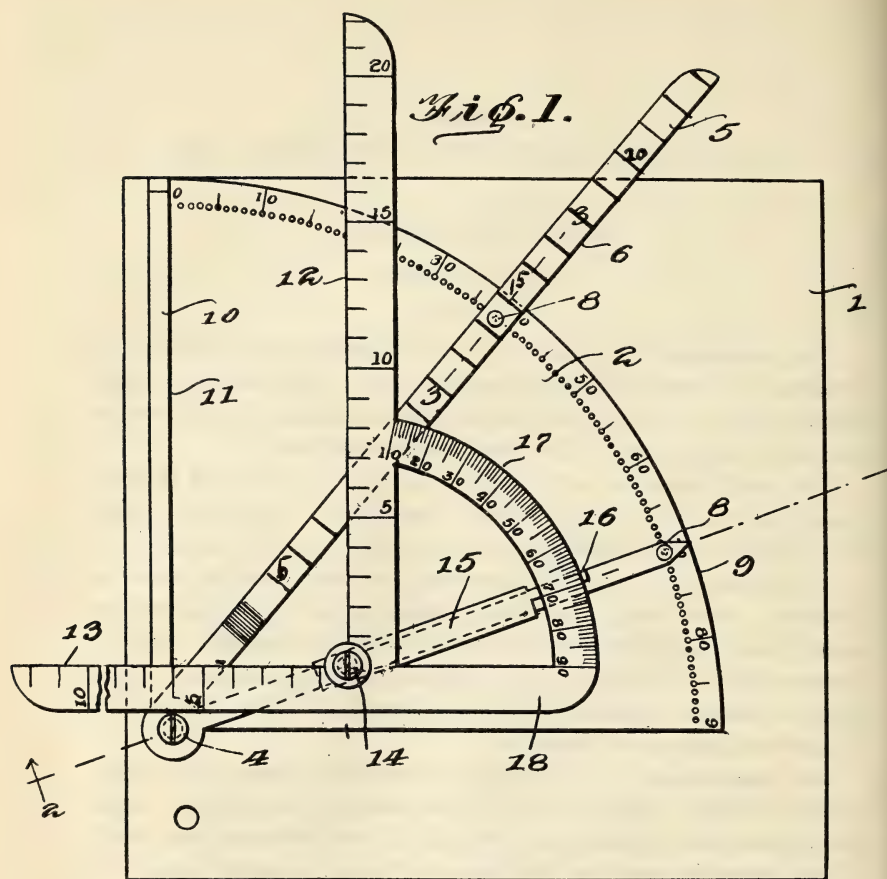
The instrument represented by the accompanying drawing is designed to determine the actual distance a ship must pass off a light or point. The elements in the determination of said distance are two bearings and the distance run between them.

The angle made by each bearing with the course and the distance run between them are determined first. The operator then sets the first angle on blade 5, and the second angle on blade 8.

The next step is to set the small arc on the square the same as blade 8. Now, slide 15, carrying blades 12 and 13, is moved out along blade 8 until the distance run on scale 12 coincides with the inner edge 6 of blade 5. The distance the ship will pass off the light or point in question will be registered on blade 13 in coincidence with edge 11 of blade 10.

The instrument is a mechanical device for Table 5B in Bowditch's Tables. It does away with the necessity to wait and watch for certain point bearings on the part of the Officer of the Deck, whose attention need not be distracted from his other duties. It makes unnecessary going below deck to secure point bearings during unfavorable weather. The only light necessary for its use at night is the binnacle light. The other factors in its favor are: (1) Its simplicity of construction (being made of metal, it will be waterproof); (2) the simplicity of its operation, already described.

There are additional uses for this instrument. It will determine: (1) The approximate distance a ship will pass off a lighthouse; (2) the initial range and deflection for gun-firing. For the determination of the approximate distance, a bearing is taken and the number of degrees off the bow is set on blade 5. Now, blade 8 and arc 17 are set at 90 degrees; slide 15 is run out until the visibility of the light from the bridge in miles on the scale on



blade 5 coincides with the inner edge of blade 12. Blade 13 will then register the distance in question, if the course is maintained.

The calculation for finding the initial range and deflection for gun-firing involves three steps: (1) Gun correction, (2) wind correction, (3) target correction. It replaces the well-known rule of thumb. In the case of gun correction we must remember to use three-quarters of the ship's speed on the scale. Set blade 8 and arc 17 at 90 degrees; blade 5 is set at the number of degrees off the bow or stern the target bore; use the scale on blade 5 for the ship's speed, bringing blade 12 into coincidence with the speed indication. Then, blade 13 will give knots of deflection and blade 12 yards of range correction.

The same process is applied for wind correction. Now we use one-half of the Beaufort Scale of Wind on blade 5. The angle direction of the wind is set on blade 5. Blade 13 will indicate deflection in knots and blade 12 yards of range. For target correction use the speed of the target in knots on blade 5 and set the angle of its course with the line of fire on arc 9 with blade 5. Now bring blade 12 into coincidence with the speed of the target on blade 5; blade 13 will read the knots of deflection and blade 12 the yards of range.

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INSTRUCTION OF PETTY OFFICERS

By LIEUTENANT D. E. CUMMINGS, U. S. Navy

FOREWORD

This paper is submitted, not as a model, but rather as a suggestion as to what points need explanation. The general outline covered by this paper has been followed when appointments have been issued to petty officers; the general idea being to question the candidate to find out how completely he has the idea, and then to fill in the "holidays." The language used should be such as will be likely to impress the particular candidate, as should the example chosen. The more homely and everyday the examples chosen the more impressive they seem to be. A talk of this character, far from antagonizing a candidate, seems to be very well received, and a number have shown that they got the idea and profited by it. That being the case, there must be some value in it, and it is offered for what it is worth.

In rating petty officers it is only fair to them and to the ship and service that they be given a clear and definite idea of what their new office carries with it in the way of opportunity and of responsibility. This has been recognized in the Navy Regulations, which require that Article 340i and the appointment be read by the candidate, and that the commanding officer deliver the appointment and sign as a witness, thus adding dignity and importance to the occasion and separating it in some degree from the single idea of an advance in pay.

When an appointment is issued to a petty officer he signs a statement thereon that he has read and *understands* the obligations imposed upon him by the appointment and by Article 340i, U. S. Navy Regulations, 1913. A little questioning, however, will usually show that the candidate's *understanding* of the meaning of that article, while perhaps correct, so far as it goes, usually falls far short of a complete understanding—and why shouldn't it? General Order No. 63 provides for a definite technical and pro-

fessional examination, but stops short of a full demonstration of what it means to be a *petty officer* as distinguished from a *rated man*. The "Bluejacket's Manual," 1915, contains a very valuable "little talk" to recruits on the subject of discipline and duty, but emphasizes obedience, punishments and a clear record chiefly. These phases of the question are of paramount interest to a recruit. A petty officer should be well indoctrinated in them and ready for a further development of his ideas of duty and discipline, a development along constructive lines, since he is now to assume definite responsibility in the upbuilding of the discipline and efficiency of the ship and of the service. Right here is where a few minutes' questioning by the division officer, the executive officer, or the commanding officer to determine how complete his understanding is, supplemented by such explanation as the answers show to be necessary, may prove of very great value to the candidate in enabling him more fully to meet the requirements of his office. Such an explanation would vary with the personality of the officer and of the candidate, and with the grasp of the subject indicated by the candidate's answers. It should always be remembered that it is the idea itself and not the technical definition that is important.

The candidate may be required to read aloud, paragraph by paragraph, Article 3401, explaining each paragraph in his own way as he goes along. Paragraph 1 reads as follows:

Petty officers shall show in themselves a good example of subordination, courage, zeal, sobriety, neatness, and attention to duty.

Now, the principal idea of this paragraph is that a petty officer is an *example* to men of lower ratings. Every candidate knows that when he came into the service he got his ideas of how to get along by watching the people who had got along before him—the petty officers; and his own seagoing habits, whether good or bad, have been very largely the outgrowth of his contact with them. Obviously, then, it is important for him to think very seriously, now that he is himself to become a petty officer, of how he should conduct himself so that to-day's recruits may by his example be encouraged to become good service men.

This first paragraph goes on to state quite definitely along what lines that good example should be shown: First, subordination, which is a ready and unquestioning obedience to the letter and spirit of such orders as may be received from proper authority;

second, courage ; third, zeal ; fourth, sobriety ; fifth, neatness ; and sixth, attention to duty.

Paragraph 2 reads as follows :

They shall aid to the utmost of their ability in maintaining good order, discipline, and all that concerns the efficiency of the command.

The outstanding idea of this paragraph is that the petty officer has got out of the class of those who always wait to be told ; he keeps an eye out on his own account for the things that should be done, and it becomes his duty to keep things moving. His aim should be that when a job is given him to do, or when a job naturally falls to him, his superior officers and petty officers need not think twice about that job because they know it will be done, and that, if any obstacle arises that seems insurmountable, it will be promptly reported to them and not neglected. It is not a crime to ask for assistance or advice, but to neglect a problem because one does not see the answer is unforgivable in a petty officer.

The meaning of the word discipline is a very important point to make clear. Discipline is variously defined : as education ; as development of the faculties by instruction and exercise ; as training, whether physical, mental or moral ; as training to act in accordance with established rules ; as accustoming to systematic and regular action ; as drill ; as subjection to rule ; as submissiveness to order and control ; as control ; as a habit of obedience (Webster). All these definitions contain the idea of co-ordination by adherence to established rules ; of instruction and exercise ; of training and development ; and underlying them all is the idea of authority.

Efficiency is defined by Webster as the "quality of . . . getting an effect," or, in common parlance, efficiency means getting the answer. There are three qualities necessary to the efficient performance of a job. In some cases one of these qualities is the most important, in some cases another ; but in all cases all three apply. The first quality is that the job, whether it be rendering honors, scrubbing decks, or sinking an enemy ship, shall be well and thoroughly done—going through the motions doesn't get much answer. The second quality is timeliness. For example it is far more important that a job be ready when it is needed than that it be performed economically. But the fact that the requirements that a job must be well done and done in time stand first does not in any way lessen the importance of the third quality, which is that it must be done economically—at the least cost of

time, labor and material. If you use all hands on a job that could be done by one section, your next job lies idle when it might as well be under way ; and then where is your efficiency? And, equally, if you try to do with a section a job that requires all hands, how can you expect to get the answer?

Discipline, efficiency, and team-work are very much alike. In all, the man must be competent to do his own job—whether it is playing shortstop or steering a life-boat. When the Red Sox have the field and the batter makes a hit, all the rest of the players do not look at the first baseman and see whose field the ball is headed for and then sit down on their bases and watch them make the play ; instead of that, every man on the team gets into position to back up those making the play. The pitcher will perhaps back up first, ready to take care of an overthrow ; shortstop and second get ready to catch their man at second if necessary ; each man backs up the man making the play, so that they go ahead confidently, knowing that the rest of the team will do their part, and even if everything doesn't " break " right, not much will get through them. So in a well-disciplined ship there is a habit of co-operation, and everybody not only does his own job right, but does it in such a manner as to make the other man's job easier. The fireman doesn't track coal dust on a clean deck, and the deck hand doesn't sift loose dirt down the fireroom hatch. And, too, this co-operation is both upward and downward—good discipline means that a petty officer not only does his job so fully and well that his superior officers don't have to worry about it and keep after him ; but also that he keeps a good eye to the work of the men under him so that they can work to the best advantage—foresees, perhaps, the need for a fresh supply of sharp scrapers and provides them in time ; plans his work so that it can all be done in orderly fashion at the proper time ; instructs his men how to work to the best advantage ; and sets high standards so that they may learn to know a good job when they see it.

Another phase of discipline is that all hands should play the same game—follow the same rules. What is more ridiculous than a boat's crew trying to win a race with all hands pulling a different stroke? Yet it might happen that the members of that crew individually are good oarsmen, only trained under different methods—one pulls with his back and another with his arms, one makes a quick finish to his stroke and another pulls evenly throughout. It is perfectly plain that they are bound to interfere with one

another and fail to keep stroke. It may well happen that there are several strokes that are perfectly good. Obviously, one has to be chosen; and any good stroke energetically followed is better than shifting constantly from one stroke to another, however excellent the various strokes may be. Until the crew all work together to accept *one* stroke—not all of them will consider it the best, perhaps—and train until they can follow it, they have neither discipline nor efficiency nor team-work. So that discipline involves a recognition of whose business it is to decide what to do and how to do it, and a cheerful acceptance of his decision.

Team-work, co-operation, doing your own job well, making the other fellow's job easier, playing the same game, according to the rules, acceptance of authority—these are the materials of which discipline is made; and the Regulations and Orders are the rules of the game.

Paragraph 3 reads thus:

They are always on duty, even while on liberty, as far as breaches of discipline are concerned, and they shall endeavor to preserve order at all times. In case men are disorderly on shore, petty officers must arrest them and return them to their ships.

It is obviously desirable to keep men out of trouble, rather than to get them into it, and therefore to prevent disorder rather than to quell it after it happens; and this is often done by the patrol when they send men who are beginning to show too much exhilaration off to their ships before they get into trouble.

The more petty officers there are who perform their duty in this respect the less disorder and consequent trouble there will be for men ashore, and the better will be the reputation of the naval uniform—which is made chiefly by those men whose actions are most unpleasantly conspicuous. Remember that the disorderly man on shore wears the naval uniform just as does the officer of the deck, just as does the captain, just as does the admiral, and just as do you, the petty officer about to receive your appointment. In requiring order on the part of men ashore, then, you are not only carrying out your bounden duty, but you are protecting the reputation of your own uniform in the service. Do not let irresponsible men be disorderly, if not for their sake, then for your own.

To sum up, you, as a petty officer, are assuming a new responsibility, and to be an adequate example to men of inferior ratings, to be subordinate, attentive, and to promote good order, dis-

cipline, and all that affects the efficiency of the command, you must exert every effort to realize and grow up to your responsibilities; and keep in mind that because other men may let down the standards is no reason for your doing so—the more you hold up the standards the better for you personally, and the more petty officers there are who do the same, the better it will be for the service.

GENERAL.—In putting into practice the above principles, one or two pitfalls may be avoided if their nature is understood. It will often happen that the prescribed method of doing things may not seem as good as some other way that you know about; or some restriction in regard to liberty or to hours or methods of work may not strike you as being just fair. There are two ways to act in such a case. One is to sulk, or to growl, or to criticize, to to “knock”; to go about it in a half-hearted way, and to let your discontent be evident to those under you. The result of this course is to make your own job harder, because your discontent rapidly spreads to those under you and you will find it doubly hard to get work out of them. It also undermines the discipline of the ship and makes trouble, not only for yourself but also for those men who are encouraged by your remarks or actions to do things that will get them into trouble. The other way is to assume that whoever has given the order has given it in good faith, and had good grounds for it, some of which you may not know; that, even if the method isn't perfect it can be made to work if you do your part; and to keep your doubts carefully hidden away in your own mind, and go ahead and carry out your orders. Sometimes it is permissible to state your doubts at a proper time and place to whoever gives the order; but never to the man that is to do the work—you at once double your own job. The result of this second way is that the job gets done with less friction, your men are more content, your job is lightened, and your reputation and efficiency are raised in the eyes both of those over you and of those under you. Be a “booster,” not a “knocker.”

It is hard for a petty officer to be unduly intimate with his subordinates and still maintain proper discipline. When you become a petty officer keep your eyes to the front—not to the rear. If you were not a better man than those under you you wouldn't be a petty officer—that's why you are rated, because you are a better man than some others. You may not have been any better originally, but now you are entitled to the respect of the men under you, and you can't get it by smoking their “butts.”

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THE CHART AS A MEANS OF FINDING GEOGRAPHICAL POSITION BY OBSERVATIONS OF CELESTIAL BODIES IN AERIAL AND MARINE NAVIGATION

By G. W. LITTLEHALES

The subject may be introduced by quoting the article of the American Practical Navigator, entitled "Circles of Equal Altitude," in which the accompanying figure is described:

In the figure, if $EE'E''$ represent the earth projected upon the horizon of a point A , and if it be assumed that, at some particular instant of time, a celestial body is in the zenith of that point, then the true altitude of the body



as observed at A will be 90° . In such a case the great circle $EE'E''$, which forms the horizon of A , will divide the earth into two hemispheres, and from any point on the surface of one of these hemispheres the body will

be visible, while over the whole of the other hemisphere it will be invisible. The great circle $EE'E''$, from the fact of its marking the limit of illumination of the body, is termed the *circle of illumination*, and from any point on its circumference the true altitude of the center of the body will be zero. If, now, we consider any small circle of the sphere, $BB'B''$, $CC'C''$, $DD'D''$, whose plane is parallel to the plane of the circle of illumination and which lies within the hemisphere throughout which the body is visible, it will be apparent that the true altitude of the body at any point of the circumference of one of these circles is equal to its true altitude at any other point of the same circumference; thus the altitude of the body at B is equal to its altitude at B' or B'' , and its altitude at D is the same as at D' or D'' .

It therefore follows that at any instant of time there is a series of positions on the earth at which a celestial body appears at the same given altitude, and these positions lie in the circumference of a circle described upon the earth's surface whose center is at that position which has the body in the zenith, and whose radius depends upon the zenith distance, or—what is the same thing—upon the altitude. Such circles are termed “circles of equal altitude.” It is important to note that an observer making an instantaneous transit through the latitudes and longitudes passed over by any rhumb-line or loxodromic curve drawn within the hemisphere of illumination, through the point A , will experience no astronomical difference, with reference to the observed body in the zenith of A , save an altitude-difference.

If the instantaneous transit so described could coincide throughout some portion of its length with the arc of a great circle passing through the point A , then the extent of the transit throughout such coinciding portion would measure the altitude-difference between the limits of this coincidence, because the altitude-difference between any two circles of equal altitude is equal to the difference of their radii; that is to say, the distance from the circumference of one to that of the other along the arc of a great circle passing through the point A . A rhumb-line or loxodromic curve crosses all the successive meridians of longitude at the same angle of inclination, but a great circle arc crosses every successive meridian at a different angle; it is on this account that a rhumb-line cannot remain coincident with a great circle. This feature of divergence between the rhumb-line and the great circle is what limits the length of the intercept or altitude-difference that can be employed on a Mercator chart in laying down a Sumner line from an estimated or assumed geographical position in accordance with the method, first proposed by Saint-Hilaire, in which a comparison is made between the altitude of a celestial body as actually *observed* and that *calculated* from the estimated or assumed position of the

observer; for the intercept is drawn as a straight line, which is a rhumb-line on the Mercator chart, while the altitude-difference is in reality the arc of a great circle, which is a curved line on the Mercator chart except when coinciding with a meridian or with the equator. Hence it is only within an extent in which the divergence between the two is not of consequence that the straight line intercept on the Mercator chart may be looked upon as representing the true distance to the Sumner line and the true direction at right angles to which that line is to be drawn.

Before proceeding to inquire how this limitation may be removed, let us ascertain the amount of its effect in turning the Sumner line out of its true direction; for it is in this respect that the effect of the divergence between the rhumb-line and the great circle first manifests itself and gains its most rapid advance as a source of error in fixing position at sea by intersecting Sumner lines plotted on the Mercator chart. If a table were formed giving the change in azimuth for an altitude-difference of one minute of arc, corresponding to successive values of the altitude h' and the azimuth Z' in the expression $\frac{\Delta Z}{\Delta h} = -\tan h' \cot Z'$, it would appear

from this tabulation that, in some circumstances, the direction of the Sumner line may be affected more than a degree for each minute of arc in the altitude-difference, and that, while the effect is in general much more moderate, especially when the observed celestial body bears more than 45° from the meridian and has not yet risen to 45° in altitude, yet in no circumstances could an altitude-difference of a length of several hundred minutes of latitude be employed without too greatly affecting the direction of the Sumner line.

As this limitation in the length of the intercept or altitude-difference that may be employed arises through the adoption of a straight line to represent an arc which is really a curved line on the Mercator chart, we are led at once to perceive that, if we construct a chart upon a system of projection having such qualities that angles are preserved nearly true and that the great circle is practically a straight line and that there is uniformity of scale within the required limits of tolerance, then we may employ intercepts of any length requisite to lay down a Sumner line anywhere within the limits of a chart from a single position chosen within its borders; and, if the simultaneous altitudes and azimuths of the

celestial bodies should be tabulated as they would appear at stated intervals of time in the chosen geographical position within the limits of the chart, an observer, in a position as yet unknown, having measured the altitude of a celestial body, could at once lay down his line of position by comparing the altitude so measured with the tabulated altitude of that body and laying off the difference between the measured and the tabulated altitude as an intercept from the chosen geographical position in the direction of the azimuth of the celestial body, as ascertained from the tabulation, and toward or away from the bearing of the body according as the measured altitude was higher or lower than the tabulated altitude. The extremity of the intercept thus laid off marks a point through which passes the Sumner line upon which the observer's position lies.

The polyconic projection, which has been extensively used in the production of charts and maps in America, possesses the qualities required for this purpose, and, accordingly, a chart of the United States constructed upon this projection has been selected as an illustrative specimen to show that geographical position is found by this method with that degree of promptness in reaching quick conclusions which is demanded in aerial navigation.

The tables¹ of simultaneous altitudes and azimuths represent these elements as they would be measured by an observer stationed in the middle of the chart, in latitude 39° and longitude 97° , at intervals of 4 minutes of hour angle from his meridian, and the tabulation embraces, besides the brighter stars, the range of the declination, both north and south of the equator, of the sun, the moon, and the planets. A large compass diagram has been centered at the middle position in latitude 39° and longitude 97° , since all the altitude-differences are laid off from there; and circumferences of equal distance from this point have also been supplied, in order that, with a given altitude-difference, the observer may at once proceed to find the point through which his line of position is to be drawn by passing out by the amount of the altitude-difference to the proper drawn or intermediate circumference along the

¹ In these tables, while the azimuth is stated in degrees and tenths of a degree, the altitudes are set down in degrees and minutes, since the minute of altitude corresponds closely with the geographical mile. Future experience is relied upon to dictate whether the altitude should be expressed in degrees and decimals of a degree instead of degrees and minutes.

radial indicated by the azimuth ascertained from the bordering tabulation.

The following example, whose solution is indicated by the intersection of the lines *AB* and *CD* on the chart, will afford a specific illustration of the procedure:

Example.—Being in flight between Leavenworth, Kans., and San Francisco, Cal., during the night of February 1, 1917, at 6^h 59^m 14^s by a watch regulated to sidereal time of the meridian of the central position of the chart (97° or 6^h 28^m West of Greenwich), observed simultaneous altitudes of α Tauri (Aldebaran), bearing westward, and α Leonis (Regulus), bearing eastward. By horizon-free sextant, true altitude of α Tauri, 55° 35' and of α Leonis 35° 13'. Find the geographical position of the observer.

<i>Solution.</i> —	α Tauri (Aldebaran)			α Leonis (Regulus)		
	<small>h</small>	<small>m</small>	<small>s</small>	<small>h</small>	<small>m</small>	<small>s</small>
Local sidereal time	6	59	14	6	59	14
Right ascension	4	31	12	10	04	00
Hour angle	2	28	02	3	4	46

With these hour angles entering the tabulation on the chart under the names of these stars

Az.	N. 114°.5 W.	N. 110°.1 E.
Alt.	50° 34'	41° 19'
Measured altitude	55° 35'	35° 13'
Altitude-difference	5° 01' = 301'	6° 06' = 366'
	in direction	in direction
	N. 114°.5 W. or	(180° + 110°.1) = 290°.1
	S. 65°.5 W.	or N. 69°.9 W.

The position-lines resulting from these observations have been plotted on the chart by passing out to the distance circumference 301 (= 5° - 01') along the radial N. 114°.5 W. and through the point thus arrived at, drawing the position-line *AB* at right angles to the radial; and, likewise, by passing out to the distance circumference 366 (= 6° - 06') along the radial N. 69°.9 W., and through the point thus arrived at, drawing the position-line *CD* at right angles to this radial. The intersection of these position lines fixes the geographical position approximately over the city of Denver, in latitude 39° 45' N. and longitude 105° W.

To amplify the illustration, a second example is presented as follows:

Example.—An observer in aerial flight along the coast of the Gulf of Mexico, during the morning of October 14, 1917, measures the true altitude of the sun's center to be 40° 14' at 9^h 06^m 06^s a. m. by a watch regulated to

mean time of the meridian 97° or $6^{\text{h}} 28^{\text{m}}$ West of Greenwich. From the Nautical Almanac, the equation of time and sun's declination at time of observation are ascertained to be:

$$\text{Eq. T.} = 13^{\text{m}} 54^{\text{s}} + \text{to m. t., Dec. } 8^{\circ} 5'.4 \text{ S.}$$

Find the Sumner line upon which the observer is located, and, by noting the intersection of this line with the coast line, the observer's geographical position.

		^h	^m	^s	
L. M. T.	=	9	06	06	
Eq. T.	=	+	13	54	
L. A. T.	=	9	20	00	
H. A.	=	2	40		Dec. — $8^{\circ} 5'.4$

Entering the tabulation on the
chart with these values of the
H. A. and Dec.
Measured altitude

Az.	132°	.7
Alt.	30°	04'
Alt.	42°	16'
	12°	$12' = 732'$ in
		direction N. $132^{\circ}.7$ E.

Passing out to the distance 732 along the radial N. $132^{\circ}.7$ E., and drawing a Sumner line at right angles to the radial, locates the aircraft on the coast a little to the eastward of Pensacola.

Under self-imposed restrictions adopted in consideration of the circumstances and limited equipment of the aerial navigator, we have arrived at the solution of these observations for geographical position without the defaults which arise from treating the great circle arc of altitude-difference as a rhumb-line, and the exactitude with which the result has been reached would, if the scale of the chart had not been reduced, be sufficient to meet the requirements of aerial navigation. The availability of charts of like design will also prove efficient in meeting the required greater exactitude of marine navigation, if, instead of drawing the line of position as a straight line, the actual curve of the "circle of equal altitudes" be employed. This has the curvature on the present chart of a parallel of latitude representing a latitude equal to the altitude of the celestial body observed to obtain the "circle of equal altitude."

In this manner the actual curves for which the straight lines *AB* and *CD* were substituted have been supplied by the side of them in order that a comparison may be made in the case in point, between the position indicated by the intersection of *AB* and *CD* and that obtained by the intersection of the arcs of the actual "circles of equal altitude."

And attention should, perhaps, be drawn to the fact that portions of the tables of simultaneous altitudes and azimuths applicable to the case of a particular flight may be taken out beforehand, although it has not been found inconvenient to consult the tables in actual flight. Of course, it will not be overlooked that these tables would, without modification, serve a like purpose in relation to a similar chart of any other part of the world traversed by the 39th degree parallel of latitude, either in the northern or southern hemisphere.¹

¹ The chart may be pasted on the back of an old chart with the tables adjoining if desired.

NORTH DECLINATION.

Hour Angle.	0°		1°		2°		3°		4°		5°		6°	
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.
h. m.	°	'	°	'	°	'	°	'	°	'	°	'	°	'
0 0	51 0.0	180.0	52 0.0	180.0	53 0.0	180.0	54 0.0	180.0	55 0.0	180.0	56 0.0	180.0	57 0.0	180.0
4	50 59.4	178.4	51 59.4	178.4	52 59.4	178.3	53 59.4	178.3	54 59.4	178.3	55 59.4	178.3	56 59.4	178.2
8	50 57.4	176.8	51 57.4	176.8	52 57.4	176.6	53 57.3	176.6	54 57.2	176.5	55 57.2	176.4	56 57.1	176.4
12	50 54.2	175.2	51 54.1	175.1	52 54.0	175.0	53 53.9	174.9	54 53.7	174.8	55 53.7	174.7	56 53.4	174.5
16	50 49.7	173.7	51 49.5	173.5	52 49.2	173.4	53 48.9	173.2	54 48.7	173.1	55 48.5	172.9	56 48.2	172.7
20	50 43.9	172.1	51 43.6	171.9	52 43.2	171.7	53 42.8	171.6	54 42.4	171.4	55 42.2	171.1	56 41.6	170.9
24	50 36.8	170.5	51 36.4	170.3	52 35.8	170.1	53 35.3	169.9	54 34.7	169.6	55 34.2	169.4	56 33.6	169.1
28	50 28.5	168.9	51 27.9	168.7	52 27.1	168.5	53 26.4	168.2	54 25.6	167.9	55 24.9	167.7	56 24.0	167.4
32	50 19.0	167.4	51 18.2	167.1	52 17.2	166.9	53 16.6	166.6	54 15.8	166.3	55 15.2	165.9	56 13.1	165.6
36	50 8.2	165.9	51 7.2	165.6	52 6.0	165.3	53 4.8	164.9	54 3.5	164.6	55 2.2	164.2	56 0.8	163.9
40	49 56.2	164.4	50 54.9	164.0	51 53.5	163.7	52 52.0	163.3	53 50.4	162.9	54 48.8	162.6	55 47.1	162.1
44	49 43.1	162.8	50 41.4	162.5	51 39.7	162.1	52 37.9	161.7	53 36.1	161.3	54 34.1	160.9	55 32.1	160.4
48	49 28.7	161.3	50 26.8	161.0	51 24.8	160.6	52 22.7	160.1	53 20.5	159.7	54 18.3	159.3	55 15.9	158.7
52	49 13.2	159.9	50 11.0	159.5	51 8.6	159.0	52 6.3	158.6	53 3.7	158.1	54 1.0	157.6	54 58.3	157.1
56	48 56.6	158.4	49 54.0	158.0	50 51.4	157.5	51 48.6	157.0	52 45.7	156.5	53 42.7	156.0	54 39.5	155.4
1 0	48 38.9	156.9	49 36.0	156.5	50 33.0	156.0	51 29.9	155.5	52 26.5	154.9	53 23.1	154.4	54 19.6	153.8
4	48 20.1	155.5	49 16.8	155.0	50 13.4	154.5	51 9.9	154.0	52 6.6	153.4	53 2.4	152.8	53 58.4	152.1
8	48 0.2	154.1	48 55.5	153.6	49 52.3	153.0	50 48.9	152.5	51 44.8	151.9	52 40.5	151.3	53 36.0	150.7
12	47 39.3	152.7	48 35.3	152.2	49 31.2	151.6	50 26.8	151.0	51 22.3	150.4	52 17.6	149.8	53 12.7	149.2
16	47 17.6	151.3	48 13.1	150.8	49 8.4	150.2	50 3.7	149.6	50 58.7	149.0	51 53.6	148.3	52 48.2	147.6
20	46 54.6	150.0	47 49.8	149.4	48 44.8	148.8	49 39.6	148.2	50 34.2	147.5	51 28.6	146.9	52 22.7	146.1
24	46 30.8	148.6	47 25.6	148.0	48 20.1	147.4	49 14.5	146.8	50 8.7	146.1	51 2.6	145.4	51 56.3	144.7
28	46 6.0	147.3	47 0.8	146.6	47 54.5	146.0	48 48.1	145.4	49 42.4	144.7	50 36.6	144.0	51 30.4	143.3
32	45 40.4	146.0	46 34.3	145.4	47 28.1	144.7	48 21.6	144.1	49 14.8	143.4	50 7.7	142.6	51 0.5	141.9
36	45 13.9	144.7	46 7.4	144.1	47 0.7	143.4	47 53.7	142.7	48 46.5	142.0	49 39.0	141.3	50 31.3	140.5
40	44 46.5	143.5	45 39.6	142.8	46 32.5	142.1	47 25.0	141.4	48 17.3	140.7	49 9.4	139.9	50 1.2	139.2
44	44 18.4	142.1	45 11.0	141.6	46 3.4	140.9	46 45.5	140.1	47 47.4	139.4	48 39.0	138.6	49 30.4	137.8
48	43 49.4	140.8	44 41.6	140.3	45 33.3	139.6	46 25.0	138.9	47 16.7	138.2	48 8.3	137.4	49 0.6	136.5
52	43 19.7	139.0	44 11.4	138.5	45 3.0	138.4	45 54.2	137.6	46 45.2	136.9	47 35.8	136.1	48 26.1	135.3
56	42 49.2	138.6	43 40.5	137.9	44 31.6	137.2	45 22.5	136.4	46 12.9	135.7	47 3.0	134.9	47 53.0	134.0
2 0	42 18.1	137.5	43 9.0	136.8	43 59.6	136.0	44 50.0	135.2	45 40.0	134.5	46 29.7	133.7	47 19.1	132.8
4	41 46.0	136.3	42 36.3	135.6	43 27.3	134.8	44 16.8	134.1	45 6.3	133.3	45 45.5	132.5	46 34.6	131.6
8	41 13.7	135.5	42 3.8	134.8	42 53.5	133.9	43 43.1	133.0	44 32.4	132.1	45 21.7	131.2	46 10.3	130.3
12	40 40.5	134.1	41 30.1	133.4	42 19.5	132.6	43 8.5	131.8	43 57.2	131.0	44 45.6	130.2	45 33.6	129.3
16	40 6.7	133.0	40 55.9	132.3	41 44.8	131.5	42 33.5	130.7	43 21.7	129.9	44 9.7	129.1	44 57.2	128.2
20	39 34.3	132.0	40 21.2	131.2	41 9.7	130.4	41 57.9	129.6	42 45.7	128.8	43 33.2	128.0	44 20.3	127.1
24	38 57.4	130.9	39 45.8	130.0	40 33.9	129.3	41 21.7	128.6	42 9.7	127.7	42 57.1	126.9	43 44.3	126.0
28	38 27.9	129.9	39 14.8	128.9	39 57.6	128.3	40 45.0	127.5	41 32.0	126.7	42 18.6	125.8	43 4.9	125.0
32	37 45.8	128.9	38 33.4	128.1	39 20.7	127.3	40 7.6	126.5	40 54.3	125.6	41 40.5	124.8	42 26.5	123.9
36	37 9.2	127.9	37 56.5	127.1	38 43.4	126.3	39 30.0	125.5	40 16.2	124.6	41 2.1	123.8	41 47.5	122.9
40	36 32.1	126.9	37 19.0	126.1	38 5.5	125.3	38 51.7	124.5	39 37.6	123.6	40 23.0	122.8	41 8.2	121.9
44	35 54.6	125.9	36 41.1	125.1	37 27.3	124.3	38 13.1	123.5	38 58.6	122.7	39 43.6	121.8	40 28.4	120.9
48	35 16.6	125.0	36 2.7	124.2	36 48.5	123.4	37 34.0	122.6	38 19.1	121.7	39 3.9	120.8	39 48.2	120.0
52	34 38.2	124.0	35 30.3	123.2	36 9.3	122.4	36 54.4	121.6	37 39.2	120.8	38 23.6	119.9	39 7.6	119.0
56	33 59.3	123.1	34 44.7	122.3	35 29.8	121.5	36 14.6	120.7	36 59.0	119.8	37 43.0	119.0	38 26.7	118.1
3 0	33 20.1	122.2	34 5.1	121.4	34 49.9	120.6	35 34.2	119.8	36 18.3	118.9	37 2.0	118.1	37 45.3	117.2
4	32 40.4	121.3	33 35.5	120.5	34 9.5	119.7	34 53.6	118.9	35 37.3	118.0	36 20.7	117.2	37 3.7	116.3
8	32 0.4	120.4	33 24.8	119.6	33 28.8	118.8	34 12.6	118.0	35 0.0	117.1	35 39.1	116.3	36 21.8	115.4
12	31 20.0	119.5	32 4.1	118.7	32 47.8	117.9	33 31.2	117.1	34 14.3	116.3	34 57.1	115.4	35 39.5	114.6
16	30 39.2	118.7	31 23.0	117.9	32 6.4	117.1	32 49.6	116.3	33 32.4	115.4	34 14.8	114.6	34 57.0	113.7
20	29 58.1	117.8	30 41.6	117.0	31 24.8	116.2	32 7.6	115.4	32 50.1	114.6	33 32.3	113.7	34 14.1	112.9
24	29 16.8	116.9	29 59.9	116.1	30 43.4	115.3	31 25.3	114.5	32 7.5	113.7	32 50.1	112.9	33 31.4	112.0
28	28 35.1	116.0	29 17.9	115.4	30 5.0	114.6	30 42.8	113.8	31 24.7	112.9	32 3.3	112.1	32 47.7	111.2
32	27 53.1	115.4	28 35.7	114.6	29 18.0	113.8	30 0.0	112.9	30 41.6	111.1	31 23.0	111.3	32 4.1	110.4
36	27 10.9	114.6	27 53.1	113.8	28 35.1	113.0	29 16.9	112.1	29 58.3	111.3	30 39.5	110.5	31 20.3	109.6
40	26 28.3	113.8	27 10.3	113.0	27 52.1	112.2	28 33.6	111.4	29 14.8	110.5	29 55.6	109.7	30 36.2	108.8
44	25 45.2	113.0	26 27.3	112.2	27 8.8	111.4	27 50.1	110.6	28 31.0	109.9	29 11.7	108.9	29 52.0	108.1
48	25 2.5	112.2	25 44.4	111.4	26 25.3	110.6	27 6.3	109.8	27 47.0	109.0	28 27.5	108.1	29 7.6	107.3
52	24 19.2	111.5	25 5.5	110.7	25 41.5	109.9	26 22.3	109.1	27 2.8	108.2	27 43.1	107.4	28 28.0	106.5
56	23 35.7	110.7	24 16.8	109.9	24 57.6	109.1	25 38.2	108.3	26 18.4	107.5	26 58.4	106.6	27 38.2	105.8
4 0	22 52.0	110.0	23 33.8	109.2	24 14.4	108.4	24 53.8	107.6	25 33.6	106.7	26 13.7	105.9	26 53.2	105.1
4	22 8.1	109.1	23 0.6	108.3	23 41.1	107.6	24 20.1	106.8	24 49.1	106.0	25 29.7	105.2	26 8.1	104.3
8	21 23.9	108.5	22 4.3	107.7	22 44.6	106.9	23 24.5	106.1	24 4.2	105.3	24 43.7	104.5	25 22.9	103.6
12	20 39.6	107.8	21 35.1	107.0	21 59.9	106.2	22 39.7	105.4	23 19.2	104.6	23 58.4	103.7	24 37.5	102.9
16	19 55.1	107.1	20 59.8	106.3	21 15.0	105.5	21 54.6	104.7	22 34.0	103.9	23 13.1	103.0	24 25.0	102.2
20	19 10.4	106.4	19 50.4	105.6	20 30.0	104.8	21 9.5	104.0	21 48.7	103.2	22 27.6	102.3	23 6.4	101.5
24	18 25.6	105.7	19 14.3	104.9	19 44.8	104.0	20 13.1	103.2	21 31.1	102.3	21 42.0	101.6	22 40.6	100.8
28	17 40.6	105.0	18 20.2	104.2	18 59.5	103.4	19 38.7	102.6	20 17.6	101.8	20 56.2	101.0	21 34.8	100.1
32	16 55.5	104.3	17 34.9	103.5	18 14.1	102.7	18 51.8	101.9	19 31.8	101.1	20 10.4	100.3	20 48.8	99.4
36	16 10.3	103.6	16 49.4	102.8	17 28.6	102.0	18 7.4	101.2	18 46.1	100.4	19 24.5	99.6	20 2.8	98.8
40	15 24.9	102.9	16 3.9	102.1	16 42.9	101.3	17 21.6	100.5	18 0.2	99.7	18 38.5	98.9	19 16.6	98.1
44	14 39.4	102.2	15 18.3	101.4	15 57.2	100.5	16 35.8	99.7	17 14.2	99.1	17 52.4	98.2	18 30.4	97.4
48														

NORTH DECLINATION.

Hour Angle.	7°		8°		9°		10°		11°		12°	
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.
h. m.												
0 0	58 0.0	180.0	59 0.0	180.0	60 0.0	180.0	61 0.0	180.0	62 0.0	180.0	63 0.0	180.0
4	57 59.3	178.1	58 59.3	178.1	59 59.2	178.0	60 59.2	177.9	61 59.1	177.8	62 59.0	177.6
8	57 57.1	176.3	58 57.0	176.2	59 56.9	176.1	60 56.8	175.9	61 56.6	175.8	62 56.5	175.6
12	57 53.2	174.4	58 53.0	174.2	59 52.8	174.1	60 52.5	173.9	61 52.3	173.7	62 52.0	173.5
16	57 48.0	172.5	58 47.7	172.3	59 47.3	172.1	60 46.9	171.9	61 46.5	171.6	62 46.0	171.4
20	57 41.2	170.7	58 40.7	170.4	59 40.1	170.2	60 39.6	169.9	61 38.9	169.6	62 38.2	169.3
24	57 32.9	168.9	58 32.2	168.6	59 31.4	168.3	60 30.5	167.9	61 29.7	167.6	62 28.7	167.2
28	57 23.1	167.0	58 22.2	166.7	59 21.2	166.3	60 20.1	165.9	61 18.9	165.6	62 17.6	165.2
32	57 11.9	165.2	58 10.7	164.8	59 9.3	164.4	60 7.9	164.0	61 6.4	163.6	62 4.8	163.1
36	56 59.4	163.5	57 57.9	163.0	58 56.2	162.6	59 54.4	162.1	60 52.5	161.6	61 50.5	161.1
40	56 45.4	161.7	57 43.5	161.2	58 41.4	160.7	59 39.2	160.2	60 37.0	159.7	61 34.5	159.1
44	56 30.1	159.9	57 27.8	159.4	58 25.4	158.9	59 22.8	158.4	60 20.1	157.8	61 17.2	157.1
48	56 13.4	158.2	57 10.7	157.7	58 7.9	157.1	59 4.9	156.5	60 1.7	155.9	60 58.0	155.2
52	55 55.4	156.5	56 52.4	155.9	57 49.1	155.4	58 45.6	154.7	59 42.0	154.1	60 38.1	153.3
0 56	55 36.2	154.9	56 32.7	154.2	57 28.9	153.6	58 25.0	153.0	59 20.9	152.3	60 16.5	151.5
1 0	55 15.9	153.2	56 11.9	152.6	57 7.6	151.9	58 3.3	151.2	58 38.6	150.5	59 33.6	149.7
4	54 54.2	151.6	55 49.7	150.9	56 45.1	150.3	57 40.1	149.5	58 35.0	148.7	59 29.5	147.9
8	54 31.4	149.9	55 26.5	149.3	56 21.3	148.6	57 15.8	147.8	58 10.7	147.0	59 4.7	146.2
12	54 7.5	148.5	55 2.1	147.7	55 56.4	147.0	56 50.5	146.2	57 44.2	145.4	58 37.6	144.5
16	53 42.6	146.9	54 36.7	146.2	55 30.5	145.4	56 24.0	144.6	57 17.2	143.8	58 10.0	142.9
20	53 16.7	145.4	54 10.3	144.7	55 3.5	143.9	55 56.4	143.1	56 49.1	142.2	57 41.3	141.3
24	52 49.7	143.9	53 42.8	143.2	54 35.5	142.4	55 28.0	141.5	56 20.0	140.6	57 11.6	139.7
28	52 21.8	142.5	53 14.4	141.7	54 6.6	140.9	54 58.5	140.0	55 50.0	139.1	56 40.4	138.2
32	51 52.9	141.1	52 44.9	140.3	53 36.6	139.4	54 28.0	138.6	55 19.0	137.6	56 9.4	136.7
36	51 23.2	139.7	52 14.8	138.9	53 5.9	138.0	53 56.8	137.1	54 47.2	136.2	55 37.0	135.2
40	50 56.6	138.3	51 43.7	137.5	52 34.3	136.6	53 24.5	135.7	54 14.4	134.8	55 3.7	133.8
44	50 21.2	137.0	51 11.7	136.2	52 1.8	135.3	52 51.7	134.4	53 41.0	133.4	54 29.8	132.4
48	49 49.0	135.7	50 39.0	134.8	51 28.6	134.0	52 17.9	133.0	53 6.6	132.1	53 54.9	131.1
52	49 16.0	134.4	50 5.6	133.6	50 54.7	132.7	51 43.4	131.7	52 31.7	130.8	53 19.4	129.8
56	48 42.4	133.2	49 31.4	132.3	50 20.1	131.4	51 8.3	130.5	51 56.0	129.5	52 43.2	128.5
2 0	48 8.1	132.0	48 56.6	131.1	49 44.8	130.2	50 32.5	129.2	51 19.7	128.3	52 6.4	127.2
4	47 33.1	130.8	48 21.2	129.9	49 8.9	129.0	49 56.1	128.0	50 42.8	127.0	51 29.0	126.0
8	46 57.4	129.6	47 45.1	128.7	48 32.2	127.8	49 18.9	126.8	50 5.2	125.8	50 50.9	124.8
12	46 21.2	128.5	47 8.4	127.5	47 55.1	126.6	48 41.4	125.7	49 27.2	124.7	50 12.5	123.7
16	45 44.4	127.3	46 31.2	126.4	47 17.4	125.5	48 3.3	124.5	48 48.6	123.5	49 33.4	122.5
20	45 1.5	126.2	45 53.4	125.3	46 39.2	124.4	47 24.6	123.4	48 9.5	122.5	48 53.8	121.4
24	44 29.3	125.2	45 15.1	124.2	46 0.5	123.3	46 45.4	122.3	47 29.8	121.4	48 13.7	120.3
28	43 50.9	124.1	44 30.3	123.2	45 21.2	122.2	46 5.8	121.3	46 48.8	120.3	47 33.3	119.3
32	43 12.1	123.1	43 57.1	122.1	44 41.6	121.2	45 25.8	120.3	46 8.4	119.3	46 52.4	118.2
36	42 32.7	122.0	43 17.3	121.1	44 1.4	120.2	44 45.2	119.2	45 28.4	118.3	46 11.1	117.2
40	41 52.9	121.0	42 37.2	120.1	43 20.9	119.2	44 4.4	118.2	44 47.2	117.3	45 29.5	116.3
44	41 12.8	120.1	41 56.7	119.1	42 40.1	118.2	43 23.1	117.3	44 5.6	116.3	44 47.5	115.3
48	40 32.2	119.1	41 15.7	118.2	41 58.8	117.2	42 41.4	116.3	43 23.0	115.3	44 5.4	114.3
52	39 51.3	118.1	40 34.5	117.2	41 17.9	116.3	41 59.5	115.4	42 41.3	114.4	43 22.6	113.4
56	39 10.0	117.2	39 52.8	116.4	40 35.2	115.4	41 17.2	114.4	41 58.7	113.5	42 39.6	112.5
3 0	38 28.3	116.3	39 10.9	115.4	39 52.9	114.5	40 34.5	113.5	41 15.7	112.6	41 56.4	111.6
4	37 46.4	115.4	38 28.6	114.5	39 10.4	113.6	39 51.7	112.7	40 34.5	111.7	41 12.8	110.7
8	37 4.1	114.5	37 46.0	113.6	38 27.5	112.7	39 8.5	111.8	39 49.1	110.8	40 29.2	109.7
12	36 21.5	113.7	37 3.2	112.8	37 44.3	111.9	38 25.1	110.9	39 5.4	110.0	39 45.3	109.0
16	35 38.7	112.8	36 20.0	111.9	37 1.0	111.0	37 41.4	110.1	38 21.4	109.2	39 1.0	108.2
20	34 55.6	112.0	35 36.6	111.1	36 17.2	110.2	36 57.5	109.3	37 37.3	108.3	38 16.6	107.4
24	34 12.2	111.2	34 53.0	110.3	35 33.4	109.4	36 59.0	108.4	37 39.0	107.5	38 18.0	106.6
28	33 28.6	110.3	34 9.1	109.5	34 49.2	108.6	35 29.0	107.6	36 8.2	106.7	37 47.2	105.8
32	32 44.8	109.5	33 25.1	108.7	34 5.0	107.8	34 44.5	106.8	35 23.6	105.9	36 2.4	105.0
36	32 0.7	108.8	32 40.8	107.9	33 20.5	107.0	33 59.7	106.1	34 38.6	105.1	35 17.1	104.2
40	31 16.4	108.0	31 56.3	107.1	32 35.8	106.2	33 14.9	105.3	33 53.6	104.4	34 31.0	103.4
44	30 32.0	107.2	31 11.6	106.3	31 50.9	105.4	32 29.8	104.5	33 8.3	103.6	33 46.4	102.7
48	29 47.4	106.4	30 26.8	105.6	31 5.8	104.7	31 44.6	103.8	32 22.9	102.9	33 0.9	102.0
52	29 2.6	105.7	29 41.8	104.8	30 20.7	103.9	30 59.3	103.1	31 37.4	102.1	32 15.2	101.2
56	28 17.6	104.8	28 56.6	104.1	29 35.3	103.2	30 13.7	102.3	30 51.8	101.4	31 29.4	100.5
4 0	27 32.5	104.2	28 11.4	103.4	28 49.9	102.5	29 28.1	101.6	30 6.0	100.7	30 43.5	99.8
4	26 47.2	103.5	27 25.9	102.6	28 4.3	101.8	28 42.4	100.9	29 20.1	100.0	29 57.5	99.1
8	26 1.8	102.8	26 40.4	101.9	27 18.6	101.1	27 56.5	100.2	28 34.1	99.3	29 11.4	98.4
12	25 16.2	102.1	25 54.7	101.2	26 32.8	100.4	27 10.6	99.5	27 48.1	98.6	28 25.3	97.7
16	24 30.5	101.4	25 8.9	100.5	25 46.9	99.7	26 24.6	98.8	27 2.0	97.9	27 39.0	97.0
20	23 44.9	100.7	24 23.0	99.8	25 0.9	99.0	25 38.5	98.1	26 15.8	97.2	26 52.7	96.4
24	22 59.0	100.0	23 37.0	99.1	24 14.8	98.3	24 52.3	97.4	25 29.5	96.6	26 6.3	95.7
28	22 13.0	99.3	22 50.9	98.5	23 28.6	97.6	24 6.0	96.8	24 43.1	95.9	25 19.9	95.0
32	21 26.9	98.6	22 4.8	97.8	22 42.4	96.9	23 19.6	96.1	23 56.7	95.2	24 33.4	94.4
36	20 40.8	97.9	21 18.5	97.1	21 56.0	96.2	22 33.3	95.4	23 10.2	94.3	23 46.9	93.7
40	19 54.6	97.3	20 32.2	96.4	21 9.6	95.6	21 46.8	94.8	22 23.7	93.9	23 3.3	93.1
44	19 8.3	96.6	19 45.8	95.8	20 23.2	94.9	21 0.3	94.1	21 37.2	93.3	22 13.8	92.4
48	18 21.9	96.0	18 59.4	95.1	19 36.7	94.3	20 13.8	93.5	20 56.6	92.6	21 27.2	91.6
52	17 35.5	95.3	18 12.9	94.4	18 50.2	93.6	19 27.2	92.8	20 4.0	92.0	20 46.6	91.1
56	16 49.1	94.7	17 26.5	93.8	18 3.6	93.0	18 40.7	92.2	19 17.4	91.3	19 33.9	90.5
5 0	16 2.6	94.0	16 39.9	93.2	17 17.1	92.4	17 54.1	91.5	18 30.8	90.7	19 7.3	89.9
4	15 16.0	93.4	15 53.4	92.5	16 30.5	91.7	17 7.5	90.9	17 44.1	90.1	18 20.7	89.2
8	14 29.5	92.7	15 6.7	91.9	15 43.9	91.1	16 20.8	90.3	16 57.6	89.4	17 34.1	88.6
12	13 42.8	92.0	14 24.2	91.3	14 20.1	90.5	15 34.7	89.6	16 10.9	88.8	16 47.5	87.8
16	12 56.2	91.4	13 33.5	90.6	14 26.6	89.8	14 47.5	89.0	15 24.3	88.2	16 0.9	87.4
20	12 9.6	90.8	12 46.8	90.0	13 24.0	89.2	14 0.9	88.4	14 37.7	87.6	15 14.3	86.8
24	11 23.0	90.2	12 0.3	89.4	12 37.3	88.6	13 14.3	87.8	13 51.1	87.0	14 27.7	86.1
28	10 35.4	89.6	11 12.7	88.7	11 58.8	87.9	12 31.3	87.1	13 4.7	86.3	13 43.1	85.5
32	9 48.8	88.9	10 27.0	88.1	11 4.2	87.1	11 41.2	86.5	12 18.0	85.7	12 54.8	84.9
36	9 3.1	88.3	9 40.4	87.5	10 17.6	86.7	10 54.7	85.9	11 3			

NORTH DECLINATION.

Hour Angle.		13°		14°		15°		16°		17°		18°	
		Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.
h. m.	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
0 0	64 0.0	180.0	65 0.0	180.0	66 0.0	180.0	67 0.0	180.0	68 0.0	180.0	69 0.0	180.0	
4	63 59.0	177.7	64 59.0	177.6	65 58.9	177.6	66 58.9	177.5	67 59.0	177.4	68 59.0	177.3	
8	63 56.4	175.5	64 56.3	175.4	65 56.2	175.2	66 56.0	175.1	67 55.9	174.8	68 55.8	174.7	
12	63 51.8	173.3	64 51.6	173.2	65 51.3	172.9	66 51.0	172.6	67 50.7	172.3	68 50.4	172.1	
16	63 45.6	171.1	64 45.1	170.9	65 44.6	170.5	66 44.0	170.2	67 43.5	169.8	68 42.9	169.5	
20	63 37.5	169.0	64 36.8	168.6	65 36.0	168.2	66 35.1	167.8	67 34.2	167.4	68 33.3	166.9	
24	63 27.8	166.8	64 26.7	166.4	65 25.7	165.9	66 24.4	165.5	67 23.1	164.9	68 21.8	164.3	
28	63 16.2	164.6	64 14.9	164.2	65 13.4	163.7	66 11.7	163.1	67 9.9	162.5	68 8.1	161.8	
32	63 3.1	162.6	64 1.3	162.0	64 59.4	161.5	65 57.3	160.8	66 55.1	160.1	67 52.7	159.4	
36	62 48.4	160.5	63 46.1	159.9	64 43.7	159.3	65 41.1	158.6	66 38.3	157.8	67 35.4	157.0	
40	62 33.0	158.5	63 29.2	157.8	64 26.4	157.1	65 23.2	156.4	66 19.0	155.6	67 16.3	154.7	
44	62 14.1	156.5	63 10.9	155.8	64 7.5	155.0	65 3.8	154.2	65 59.8	153.4	66 55.6	152.4	
48	61 54.7	154.5	62 51.0	153.8	63 47.0	153.0	64 42.7	152.1	65 38.1	151.2	66 33.1	150.2	
52	61 34.0	152.6	62 29.7	151.8	63 25.1	151.0	64 20.2	150.1	65 14.9	149.1	66 9.3	148.1	
0 56	61 11.8	150.7	62 7.0	149.9	63 1.8	149.0	63 56.8	148.1	64 50.1	147.0	65 43.8	146.0	
1 0	60 48.4	148.9	61 42.9	148.0	62 37.1	147.1	63 30.8	146.1	64 24.1	145.1	65 17.1	143.9	
4	60 23.7	147.1	61 17.6	146.2	62 11.1	145.2	63 4.4	144.2	63 56.8	143.2	64 49.0	142.0	
8	59 57.7	145.3	60 51.0	144.4	61 43.9	143.4	62 36.3	142.4	63 28.3	141.3	64 19.7	140.1	
12	59 30.6	143.6	60 23.2	142.6	61 15.5	141.6	62 7.2	140.6	62 58.3	139.4	63 49.1	138.2	
16	59 2.4	141.9	59 54.4	140.9	60 46.0	139.9	61 37.0	138.8	62 27.6	137.7	63 17.5	136.5	
20	58 33.2	140.3	59 44.6	139.3	60 15.6	138.2	61 5.9	137.1	61 55.7	136.0	62 44.9	134.7	
24	58 2.8	138.7	58 53.7	137.7	59 44.0	136.6	60 33.7	135.5	61 22.8	134.3	62 11.4	133.1	
28	57 31.6	137.2	58 21.8	136.1	59 11.5	135.1	60 0.5	133.9	60 49.0	132.7	61 36.8	131.5	
32	56 59.4	135.7	57 49.0	134.6	58 38.1	133.5	59 26.5	132.4	60 14.3	131.2	61 1.5	129.9	
36	56 26.5	134.2	57 15.4	133.1	58 3.9	132.0	58 51.6	130.9	59 38.8	129.7	60 25.2	128.4	
40	55 52.6	132.8	56 41.0	131.7	57 28.8	130.6	58 16.0	129.4	59 2.5	128.2	59 48.4	127.0	
44	55 18.1	131.4	55 5.9	130.3	56 53.1	129.2	57 39.6	128.0	58 25.6	126.8	59 10.7	125.5	
48	54 42.7	130.0	55 29.9	128.9	56 16.6	127.8	57 2.5	126.7	57 47.8	125.5	58 32.5	124.2	
52	54 6.7	128.7	54 56.3	127.6	55 39.4	126.5	56 24.8	125.3	57 9.5	124.1	57 53.0	122.9	
1 56	53 29.9	127.4	54 13.1	126.3	55 1.7	125.2	55 46.5	124.0	56 30.7	122.8	57 14.1	121.6	
2 0	52 52.6	126.2	53 38.2	125.1	54 23.3	124.0	55 7.6	122.8	55 51.3	121.6	56 34.2	120.3	
4	52 14.6	125.0	52 59.8	123.9	53 44.3	122.8	54 28.1	121.6	55 11.2	120.4	55 53.6	119.1	
8	51 36.1	123.8	52 20.8	122.7	53 4.8	121.6	53 48.1	120.4	54 30.8	119.2	55 12.7	118.0	
12	50 57.1	122.6	51 41.3	121.5	52 24.8	120.4	53 7.6	119.2	53 49.8	118.0	54 31.3	116.8	
16	50 17.6	121.5	51 1.3	120.4	51 44.4	119.3	52 26.7	118.1	53 8.5	116.9	53 49.5	115.7	
20	49 37.6	120.4	50 20.9	119.3	51 3.5	118.2	51 45.4	117.0	52 26.7	115.8	53 7.3	114.6	
24	48 57.1	119.3	49 40.0	118.2	50 22.3	117.1	51 3.7	116.0	51 44.6	114.8	52 24.7	113.6	
28	48 16.3	118.2	48 58.7	117.2	49 40.5	116.1	50 21.6	114.9	51 2.0	113.8	51 49.1	112.6	
32	47 35.0	117.2	47 17.1	116.1	48 58.5	115.1	49 39.2	113.9	50 19.2	112.8	50 58.7	111.6	
36	46 53.3	116.2	47 34.9	115.1	48 16.0	114.1	48 56.4	112.9	49 36.1	111.8	50 15.2	110.6	
40	46 11.3	115.2	46 52.6	114.2	47 33.2	113.1	48 13.3	112.0	48 52.6	110.8	49 31.3	109.7	
44	45 29.0	114.3	46 9.9	113.2	46 50.2	112.1	47 29.9	111.0	48 8.9	109.9	48 37.3	108.7	
48	44 46.3	113.3	45 26.9	112.3	46 6.9	111.2	46 46.2	110.1	47 24.9	109.0	48 3.0	107.8	
52	44 3.4	112.4	44 43.6	111.4	45 23.3	110.3	46 2.3	109.2	46 40.7	108.1	47 18.6	107.0	
2 56	43 20.1	111.5	44 0.0	110.5	44 39.4	109.4	45 18.1	108.3	45 56.2	107.2	46 33.8	106.1	
3 0	42 36.5	110.6	43 16.2	109.6	43 55.3	108.5	44 33.8	107.4	45 11.7	106.4	45 48.8	105.3	
4	41 52.8	109.7	42 32.1	108.7	43 11.0	107.7	43 49.2	106.6	44 26.8	105.5	45 3.8	104.4	
8	41 8.8	108.9	41 47.9	107.9	42 26.4	106.8	43 4.4	105.8	43 41.8	104.7	44 18.6	103.6	
12	40 24.5	108.0	41 3.5	107.0	41 41.7	106.0	42 19.4	104.9	42 56.6	103.9	43 33.2	102.8	
16	39 40.1	107.2	40 18.7	106.2	40 56.8	105.2	41 34.3	104.1	42 11.2	103.1	42 47.6	102.0	
20	38 55.4	106.4	39 33.8	105.4	40 11.7	104.4	40 49.0	103.3	41 25.8	102.3	42 3.0	101.2	
24	38 10.6	105.6	38 48.8	104.6	39 26.5	103.6	40 3.6	102.6	40 40.1	101.5	41 16.2	100.5	
28	37 25.0	104.8	38 3.6	103.8	38 41.1	102.8	39 18.0	101.8	39 54.4	100.8	40 30.3	99.5	
32	36 40.4	104.0	37 18.2	103.0	37 55.5	102.1	38 32.3	101.0	39 8.5	100.0	39 44.3	99.0	
36	35 55.1	103.3	36 34.7	102.3	37 9.9	101.3	37 40.5	100.3	38 22.5	99.3	38 58.2	98.3	
40	35 9.7	102.5	35 47.1	101.5	36 24.1	100.6	37 0.5	99.6	37 36.5	98.6	38 13.0	97.5	
44	34 24.1	101.8	35 1.4	100.8	35 38.2	99.8	36 14.5	98.8	36 50.3	97.9	37 25.7	96.8	
48	33 38.4	101.0	34 15.6	100.1	34 52.2	99.1	35 28.4	98.1	36 4.1	97.2	36 39.4	96.1	
52	32 52.5	100.3	33 29.6	99.4	34 6.1	98.4	34 42.2	97.4	35 17.8	96.5	35 53.0	95.5	
3 56	32 6.6	99.6	32 43.5	98.6	33 20.0	97.7	33 56.0	96.7	34 31.5	95.8	35 6.6	94.8	
4 0	31 20.6	98.9	31 57.3	97.9	32 33.6	97.0	33 9.6	96.1	33 45.1	95.1	34 20.1	94.1	
4	30 34.6	98.2	31 11.2	97.3	31 47.4	96.3	32 23.2	95.4	32 58.6	94.4	33 33.6	93.5	
8	29 48.3	97.5	30 24.9	96.7	31 1.0	95.0	31 36.7	94.7	32 12.1	93.8	32 47.0	92.8	
12	28 59.1	96.8	29 38.5	95.9	30 14.6	95.0	30 50.2	94.0	31 25.5	93.1	32 0.4	92.1	
16	28 15.7	96.1	28 52.1	95.2	29 28.1	94.3	30 3.7	93.4	30 38.9	92.4	31 13.8	91.5	
20	27 29.4	95.5	28 5.6	94.7	28 41.6	93.7	29 17.1	92.7	29 52.4	91.8	30 27.2	90.9	
24	26 42.9	94.8	27 19.1	94.1	27 55.0	93.0	28 30.5	92.1	29 5.7	91.2	29 40.6	90.2	
28	25 56.4	94.1	26 32.6	93.3	27 8.5	92.7	27 43.9	91.4	28 19.1	90.5	28 53.9	89.6	
32	25 9.8	93.5	25 46.1	92.6	26 21.9	91.7	26 57.4	90.8	27 32.5	89.9	28 7.3	89.0	
36	24 23.3	92.8	24 59.4	92.0	25 35.3	91.1	26 10.7	90.2	26 45.9	89.3	27 20.7	88.3	
40	23 36.7	92.2	24 12.8	91.3	24 48.6	90.4	25 24.1	89.5	25 59.2	88.6	26 34.1	87.7	
44	22 50.1	91.5	23 26.2	90.7	24 2.0	89.8	24 37.5	88.9	25 12.6	88.0	25 47.5	87.1	
48	22 3.5	90.9	22 39.6	90.0	23 15.4	89.2	23 50.8	88.3	24 26.0	87.4	25 0.9	86.5	
52	21 16.9	90.3	21 53.0	89.4	22 28.8	88.6	23 4.3	87.7	23 39.5	86.8	24 14.4	85.9	
4 56	20 30.2	89.6	21 6.3	88.8	21 42.1	87.9	22 17.6	87.1	22 52.9	86.2	23 27.9	85.3	
5 0	19 43.2	88.9	20 19.7	88.2	20 55.6	87.3	21 31.2	86.5	22 6.5	85.6	22 41.5	84.7	
4	18 57.0	88.4	19 33.1	87.6	20 3.0	86.7	20 44.0	85.8	21 20.0	85.0	21 55.1	84.1	
8	18 10.4	87.8	18 46.5	86.9	19 22.4	86.1	19 58.1	85.2	20 33.5	84.4	21 8.7	83.5	
12	17 23.8	87.2	18 0.0	86.3	18 36.0	85.5	19 11.7	84.6	19 47.2	83.8	20 22.4	82.9	
16	16 37.3	86.6	17 13.5	85.7	17 49.5	84.9	18 25.2	84.0	19 0.8	83.2	19 36.2	82.3	
20	15 50.8	85.9	16 27.1	85.1	17 3.1	84.3	17 38.9	83.4	18 14.6	82.6	18 50.0	81.7	
24	15 4.2	85.3	15 40.6	84.5	16 16.8	83.7	16 52.6	82.8	17 28.4	82.0	18 3.9	81.1	
28	14												

NORTH DECLINATION.

Hour Angle.	19°		20°		21°		22°		23°		24°	
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.
h. m.												
0	70 0.0	180.0	71 0.0	180.0	72 0.0	180.0	73 0.0	180.0	74 0.0	180.0	75 0.0	180.0
1	59 59.0	179.0	70 59.0	179.0	71 59.0	179.0	72 59.0	179.0	73 59.0	179.0	74 59.0	179.0
2	49 58.0	178.0	60 58.0	178.0	61 58.0	178.0	62 58.0	178.0	63 58.0	178.0	64 58.0	178.0
3	39 57.0	177.0	50 57.0	177.0	51 57.0	177.0	52 57.0	177.0	53 57.0	177.0	54 57.0	177.0
4	29 56.0	176.0	40 56.0	176.0	41 56.0	176.0	42 56.0	176.0	43 56.0	176.0	44 56.0	176.0
5	19 55.0	175.0	30 55.0	175.0	31 55.0	175.0	32 55.0	175.0	33 55.0	175.0	34 55.0	175.0
6	9 54.0	174.0	20 54.0	174.0	21 54.0	174.0	22 54.0	174.0	23 54.0	174.0	24 54.0	174.0
7	0 53.0	173.0	11 53.0	173.0	12 53.0	173.0	13 53.0	173.0	14 53.0	173.0	15 53.0	173.0
8	59 52.0	172.0	60 52.0	172.0	61 52.0	172.0	62 52.0	172.0	63 52.0	172.0	64 52.0	172.0
9	49 51.0	171.0	50 51.0	171.0	51 51.0	171.0	52 51.0	171.0	53 51.0	171.0	54 51.0	171.0
10	39 50.0	170.0	40 50.0	170.0	41 50.0	170.0	42 50.0	170.0	43 50.0	170.0	44 50.0	170.0
11	29 49.0	169.0	30 49.0	169.0	31 49.0	169.0	32 49.0	169.0	33 49.0	169.0	34 49.0	169.0
12	19 48.0	168.0	20 48.0	168.0	21 48.0	168.0	22 48.0	168.0	23 48.0	168.0	24 48.0	168.0
13	9 47.0	167.0	11 47.0	167.0	12 47.0	167.0	13 47.0	167.0	14 47.0	167.0	15 47.0	167.0
14	0 46.0	166.0	11 46.0	166.0	12 46.0	166.0	13 46.0	166.0	14 46.0	166.0	15 46.0	166.0
15	59 45.0	165.0	60 45.0	165.0	61 45.0	165.0	62 45.0	165.0	63 45.0	165.0	64 45.0	165.0
16	49 44.0	164.0	50 44.0	164.0	51 44.0	164.0	52 44.0	164.0	53 44.0	164.0	54 44.0	164.0
17	39 43.0	163.0	40 43.0	163.0	41 43.0	163.0	42 43.0	163.0	43 43.0	163.0	44 43.0	163.0
18	29 42.0	162.0	30 42.0	162.0	31 42.0	162.0	32 42.0	162.0	33 42.0	162.0	34 42.0	162.0
19	19 41.0	161.0	20 41.0	161.0	21 41.0	161.0	22 41.0	161.0	23 41.0	161.0	24 41.0	161.0
20	9 40.0	160.0	11 40.0	160.0	12 40.0	160.0	13 40.0	160.0	14 40.0	160.0	15 40.0	160.0
21	0 39.0	159.0	11 39.0	159.0	12 39.0	159.0	13 39.0	159.0	14 39.0	159.0	15 39.0	159.0
22	59 38.0	158.0	60 38.0	158.0	61 38.0	158.0	62 38.0	158.0	63 38.0	158.0	64 38.0	158.0
23	49 37.0	157.0	50 37.0	157.0	51 37.0	157.0	52 37.0	157.0	53 37.0	157.0	54 37.0	157.0
24	39 36.0	156.0	40 36.0	156.0	41 36.0	156.0	42 36.0	156.0	43 36.0	156.0	44 36.0	156.0
25	29 35.0	155.0	30 35.0	155.0	31 35.0	155.0	32 35.0	155.0	33 35.0	155.0	34 35.0	155.0
26	19 34.0	154.0	20 34.0	154.0	21 34.0	154.0	22 34.0	154.0	23 34.0	154.0	24 34.0	154.0
27	9 33.0	153.0	11 33.0	153.0	12 33.0	153.0	13 33.0	153.0	14 33.0	153.0	15 33.0	153.0
28	0 32.0	152.0	11 32.0	152.0	12 32.0	152.0	13 32.0	152.0	14 32.0	152.0	15 32.0	152.0
29	59 31.0	151.0	60 31.0	151.0	61 31.0	151.0	62 31.0	151.0	63 31.0	151.0	64 31.0	151.0
30	49 30.0	150.0	50 30.0	150.0	51 30.0	150.0	52 30.0	150.0	53 30.0	150.0	54 30.0	150.0
31	39 29.0	149.0	40 29.0	149.0	41 29.0	149.0	42 29.0	149.0	43 29.0	149.0	44 29.0	149.0
32	29 28.0	148.0	30 28.0	148.0	31 28.0	148.0	32 28.0	148.0	33 28.0	148.0	34 28.0	148.0
33	19 27.0	147.0	20 27.0	147.0	21 27.0	147.0	22 27.0	147.0	23 27.0	147.0	24 27.0	147.0
34	9 26.0	146.0	11 26.0	146.0	12 26.0	146.0	13 26.0	146.0	14 26.0	146.0	15 26.0	146.0
35	0 25.0	145.0	11 25.0	145.0	12 25.0	145.0	13 25.0	145.0	14 25.0	145.0	15 25.0	145.0
36	59 24.0	144.0	60 24.0	144.0	61 24.0	144.0	62 24.0	144.0	63 24.0	144.0	64 24.0	144.0
37	49 23.0	143.0	50 23.0	143.0	51 23.0	143.0	52 23.0	143.0	53 23.0	143.0	54 23.0	143.0
38	39 22.0	142.0	40 22.0	142.0	41 22.0	142.0	42 22.0	142.0	43 22.0	142.0	44 22.0	142.0
39	29 21.0	141.0	30 21.0	141.0	31 21.0	141.0	32 21.0	141.0	33 21.0	141.0	34 21.0	141.0
40	19 20.0	140.0	20 20.0	140.0	21 20.0	140.0	22 20.0	140.0	23 20.0	140.0	24 20.0	140.0
41	9 19.0	139.0	11 19.0	139.0	12 19.0	139.0	13 19.0	139.0	14 19.0	139.0	15 19.0	139.0
42	0 18.0	138.0	11 18.0	138.0	12 18.0	138.0	13 18.0	138.0	14 18.0	138.0	15 18.0	138.0
43	59 17.0	137.0	60 17.0	137.0	61 17.0	137.0	62 17.0	137.0	63 17.0	137.0	64 17.0	137.0
44	49 16.0	136.0	50 16.0	136.0	51 16.0	136.0	52 16.0	136.0	53 16.0	136.0	54 16.0	136.0
45	39 15.0	135.0	40 15.0	135.0	41 15.0	135.0	42 15.0	135.0	43 15.0	135.0	44 15.0	135.0
46	29 14.0	134.0	30 14.0	134.0	31 14.0	134.0	32 14.0	134.0	33 14.0	134.0	34 14.0	134.0
47	19 13.0	133.0	20 13.0	133.0	21 13.0	133.0	22 13.0	133.0	23 13.0	133.0	24 13.0	133.0
48	9 12.0	132.0	11 12.0	132.0	12 12.0	132.0	13 12.0	132.0	14 12.0	132.0	15 12.0	132.0
49	0 11.0	131.0	11 11.0	131.0	12 11.0	131.0	13 11.0	131.0	14 11.0	131.0	15 11.0	131.0
50	59 10.0	130.0	60 10.0	130.0	61 10.0	130.0	62 10.0	130.0	63 10.0	130.0	64 10.0	130.0
51	49 9.0	129.0	50 9.0	129.0	51 9.0	129.0	52 9.0	129.0	53 9.0	129.0	54 9.0	129.0
52	39 8.0	128.0	40 8.0	128.0	41 8.0	128.0	42 8.0	128.0	43 8.0	128.0	44 8.0	128.0
53	29 7.0	127.0	30 7.0	127.0	31 7.0	127.0	32 7.0	127.0	33 7.0	127.0	34 7.0	127.0
54	19 6.0	126.0	20 6.0	126.0	21 6.0	126.0	22 6.0	126.0	23 6.0	126.0	24 6.0	126.0
55	9 5.0	125.0	11 5.0	125.0	12 5.0	125.0	13 5.0	125.0	14 5.0	125.0	15 5.0	125.0
56	0 4.0	124.0	11 4.0	124.0	12 4.0	124.0	13 4.0	124.0	14 4.0	124.0	15 4.0	124.0
57	59 3.0	123.0	60 3.0	123.0	61 3.0	123.0	62 3.0	123.0	63 3.0	123.0	64 3.0	123.0
58	49 2.0	122.0	50 2.0	122.0	51 2.0	122.0	52 2.0	122.0	53 2.0	122.0	54 2.0	122.0
59	39 1.0	121.0	40 1.0	121.0	41 1.0	121.0	42 1.0	121.0	43 1.0	121.0	44 1.0	121.0
60	29 0.0	120.0	30 0.0	120.0	31 0.0	120.0	32 0.0	120.0	33 0.0	120.0	34 0.0	120.0
61	19 59.0	119.0	20 59.0	119.0	21 59.0	119.0	22 59.0	119.0	23 59.0	119.0	24 59.0	119.0
62	9 58.0	118.0	11 58.0	118.0	12 58.0	118.0	13 58.0	118.0	14 58.0	118.0	15 58.0	118.0
63	0 57.0	117.0	11 57.0	117.0	12 57.0	117.0	13 57.0	117.0	14 57.0	117.0	15 57.0	117.0
64	59 56.0	116.0	60 56.0	116.0	61 56.0	116.0	62 56.0	116.0	63 56.0	116.0	64 56.0	116.0
65	49 55.0	115.0	50 55.0	115.0	51 55.0	115.0	52 55.0	115.0	53 55.0	115.0	54 55.0	115.0
66	39 54.0	114.0	40 54.0	114.0	41 54.0	114.0	42 54.0	114.0	43 54.0	114.0	44 54.0	114.0
67	29 53.0	113.0	30 53.0	113.0	31 53.0	113.0	32 53.0	113.0	33 53.0	113.0	34 53.0	113.0
68	19 52.0	112.0	20 52.0	112.0	21 52.0	112.0	22 52.0	112.0	23 52.0	112.0	24 52.0	112.0
69	9 51.0	111.0	11 51.0	111.0	12 51.0	111.0	13 51.0	111.0	14 51.0	111.0	15 51.0	111.0
70	0 50.0	110.0	11 50.0	110.0	12 50.0	110.0	13 50.0	110.0	14 50.0	110.0	15 50.0	110.0
71	59 49.0	109.0	60 49.0	109.0	61 49.0	109.0	62 49.0	109.0	63 49.0	109.0	64 49.0	109.0
72	49 48.0	108.0	50 48.0	108.0	51 48.0	108.0	52 48.0	108.0	53 48.0	108.0	54 48.0	108.0
73	39 47.0	107.0	40 47.0	107.0	41 47.0	107.0	42 47.0	107.0	43 47.0	107.0	44 47.0	107.0
74	29 46.0	106.0	30 46.0	106.0	31 46.0	106.0	32 46.0	106.0	33 46.0	106.0	34 46.0	106.0
75	19 45.0	105.0	20 45.0	105.0	21 45.0	105.0	22 45.0	105.0	23 45.0	105.0	24 45.0	105.0
76	9 44.0	104.0	11 44.0	104.0	12 44.0	104.0	13 44.0	104.0	14 44.0	104.0	15 44.0	104.0
77	0 43.0	103.0	11 43.0	103.0	12 43.0	103.0	13 43.0	103.0	14 43.0	103.0	15 43.0	103.0
78	59 42.0	102.0	60 42.0	102.0	61 42.0	102.0	62 42.0	102.0	63 42.0	102.0	64 42.0	102.0
79	49 41.0	101.0	50 41.0	101.0	51 41.0	101.0	52 41.0	101.0	53 41.0	101.0	54 41.0	101.0
80	39 40.0	100.0	40 40.0	100.0	41 40.0	100.0	42 40.0	100.0	43 40.0	100.0	44 40.0	100.0
81	29 39.0	99.0	30 39.0	99.0	31 39.0	99.0	32 39.0	99.0	33 39.0	99.0	34 39.0	99.0
82	19 38.0	98.0	20 38.0	98.0	21 38.0	98.0	22 38.0	98.0	23 38.0	98.0	24 38.0	98.0
83	9 37.0	97.0	11 37.0	97.0	12 37.0	97.0	13 37.0	97.0	14 37.0	97.0	15 37.0	97.0

SOUTH DECLINATION

Hour Angle.		0°		1°		2°		3°		4°		5°		6°	
		Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.
h. m.	0	51 0.0	180.0	50 0.0	180.0	49 0.0	180.0	48 0.0	180.0	47 0.0	180.0	46 0.0	180.0	45 0.0	180.0
4	0	50 59.4	178.4	49 59.4	178.4	48 59.5	178.5	47 59.5	178.5	46 59.5	178.5	45 59.5	178.6	44 59.5	178.6
8	0	50 57.4	176.8	49 57.5	176.9	48 57.6	177.0	47 57.6	177.0	46 57.6	177.1	45 57.7	177.1	44 57.8	177.2
12	0	50 54.2	175.2	49 54.3	175.3	48 54.5	175.4	47 54.6	175.5	46 54.7	175.6	45 54.8	175.7	44 54.9	175.8
16	0	50 49.7	173.7	49 49.9	173.8	48 50.1	173.9	47 50.3	174.0	46 50.5	174.1	45 50.7	174.2	44 50.9	174.4
20	0	50 43.9	172.1	49 44.3	172.3	48 44.6	172.4	47 44.8	172.6	46 45.1	172.7	45 45.5	172.9	44 45.8	173.0
24	0	50 36.8	170.5	49 37.3	170.7	48 37.8	170.9	47 38.3	171.1	46 38.7	171.3	45 39.1	171.4	44 39.5	171.6
28	0	50 28.5	169.0	49 29.2	169.2	48 29.8	169.4	47 30.4	169.6	46 31.0	169.8	45 31.6	170.0	44 32.1	170.2
32	0	50 19.0	167.5	49 19.8	167.7	48 20.2	167.9	47 21.4	168.2	46 22.2	168.4	45 22.9	168.6	44 23.7	168.8
36	0	50 8.2	165.9	49 9.3	166.2	48 10.4	166.4	47 11.3	166.7	46 12.3	167.0	45 13.2	167.2	44 14.1	167.5
40	0	49 56.2	164.4	48 57.6	164.7	47 58.8	165.0	47 0.0	165.3	46 1.2	165.6	45 2.3	165.8	44 3.4	166.1
44	0	49 43.1	162.8	48 44.7	163.2	47 46.2	163.5	46 47.6	163.8	45 49.0	164.2	44 50.4	164.5	43 51.7	164.8
48	0	49 28.7	161.3	48 30.6	161.7	47 32.3	162.1	46 34.4	162.4	45 35.7	162.8	44 37.3	163.1	43 38.9	163.4
52	0	49 13.2	159.9	48 15.4	160.3	47 17.4	160.7	46 19.4	161.0	45 21.3	161.4	44 23.2	161.7	43 25.0	162.1
56	0	48 56.6	158.4	47 59.0	158.8	47 1.4	159.2	46 3.7	159.6	45 5.5	160.0	44 8.1	160.4	43 10.1	160.7
1 0	4	48 38.9	156.9	47 41.7	157.4	46 44.3	157.8	45 46.9	158.3	44 49.4	159.7	43 51.9	159.1	42 54.2	159.4
4	4	48 20.1	155.5	47 23.3	156.0	46 26.3	156.4	45 29.1	156.9	44 32.0	157.3	43 34.7	157.7	42 37.3	158.1
8	4	48 0.2	154.1	47 3.7	154.6	46 7.1	155.1	45 10.3	155.5	44 13.5	156.0	43 16.6	156.4	42 19.5	156.9
12	4	47 39.3	152.7	46 43.2	153.2	45 46.9	153.7	44 50.6	154.2	43 54.1	154.7	42 57.4	155.1	42 0.7	155.6
16	4	47 17.6	151.3	46 21.7	151.9	45 25.8	152.4	44 29.8	152.9	43 33.6	153.4	42 37.4	153.9	41 41.0	154.3
20	4	46 54.6	150.0	45 59.2	150.5	45 3.7	151.1	44 8.1	151.6	43 12.3	152.1	42 16.4	152.6	41 20.4	153.1
24	4	46 30.8	148.6	45 35.9	149.0	44 40.7	149.8	43 45.4	150.3	42 50.0	150.8	41 54.4	151.3	40 58.7	151.8
28	4	46 0.0	147.3	45 11.5	147.9	44 16.8	148.5	43 21.9	149.2	42 26.7	149.6	41 31.0	150.0	40 36.0	150.0
32	4	45 40.4	146.0	44 40.3	146.6	43 45.9	147.2	42 57.4	147.8	42 2.7	148.3	41 7.9	148.9	40 33.0	149.4
36	4	45 13.9	144.7	44 20.2	145.4	43 26.2	146.0	42 32.1	146.6	41 37.8	147.1	40 43.8	147.7	39 48.8	148.2
40	4	44 46.5	143.5	43 53.2	144.1	42 59.7	144.7	42 6.0	145.3	41 12.1	145.9	40 18.1	146.5	39 23.8	147.1
44	4	44 18.4	142.2	43 25.5	142.9	42 32.4	143.5	41 39.1	144.1	40 45.6	144.7	39 52.0	145.3	38 58.1	145.9
48	4	43 49.4	141.0	42 57.0	141.7	42 4.2	142.3	41 11.4	143.0	40 18.3	143.4	39 25.0	144.5	38 31.6	144.8
52	4	43 19.7	139.8	42 27.7	140.5	41 35.4	141.2	40 42.6	141.8	39 50.2	142.4	38 57.4	143.1	38 4.3	143.6
56	4	42 49.2	138.6	41 57.6	139.3	41 5.8	140.0	40 13.7	140.6	39 21.4	141.3	38 29.0	141.9	37 36.3	142.5
2 0	4	42 18.1	137.5	41 26.9	138.2	40 35.4	138.8	39 43.7	139.5	38 51.8	140.2	37 59.8	140.8	37 7.5	141.4
4	4	41 53.7	136.3	41 05.5	137.0	40 19.7	137.4	39 28.4	138.1	38 36.9	138.8	37 45.1	139.4	36 1.3	140.3
8	4	41 33.7	135.2	40 45.2	135.9	39 39.2	136.6	38 41.0	137.3	37 50.8	138.0	36 59.5	138.6	35 0.8	139.3
12	4	40 40.5	134.1	39 50.6	134.8	39 0.4	135.5	38 9.9	136.2	37 19.3	136.9	36 28.4	137.6	35 37.3	138.2
16	4	40 6.7	133.0	39 17.2	133.8	38 27.4	134.5	37 37.4	135.2	36 47.1	135.9	35 56.6	136.5	35 35.9	137.2
20	4	39 32.3	132.0	38 43.2	132.7	37 53.9	133.4	37 4.2	134.1	36 14.3	134.8	35 24.2	135.5	34 33.9	136.2
24	4	38 57.4	130.9	38 3.7	131.7	37 19.7	132.4	36 30.4	133.1	35 40.9	133.8	34 51.3	134.1	34 1.3	135.1
28	4	38 21.9	129.9	37 33.5	130.6	36 44.9	131.4	35 56.1	132.1	35 7.0	132.8	34 17.7	133.5	33 28.2	134.2
32	4	37 45.8	128.9	36 57.9	129.6	36 9.7	130.4	35 22.1	131.1	34 32.5	131.8	33 43.6	132.5	32 54.4	133.9
36	4	37 9.2	127.9	36 21.7	128.6	35 33.3	129.4	34 45.8	130.1	33 57.5	130.8	33 9.0	131.5	32 20.1	132.2
40	4	36 34.4	126.6	35 45.1	127.6	34 57.6	128.4	34 9.9	129.1	33 21.9	129.8	32 33.8	130.6	31 45.3	131.3
44	4	35 54.6	125.9	35 3.7	126.7	34 20.8	127.4	33 33.5	128.2	32 45.9	128.9	31 58.1	129.6	31 10.0	130.3
48	4	35 16.6	125.0	34 30.3	125.8	33 43.5	126.5	32 56.0	127.2	32 4.4	128.0	31 28.0	128.7	30 14.2	129.4
52	4	34 38.2	124.0	33 52.1	124.8	33 5.8	125.6	32 19.2	126.3	31 32.3	127.0	30 45.2	127.8	29 57.9	128.5
56	4	33 59.3	123.1	33 13.6	123.9	32 27.6	124.6	31 41.4	125.4	30 54.9	126.1	30 8.2	126.9	29 21.2	127.0
3 0	4	33 20.1	122.2	32 34.0	123.0	31 49.1	123.7	31 3.2	124.5	30 17.0	125.2	29 30.7	126.0	28 44.0	126.7
4	4	32 40.4	121.3	31 55.4	122.1	31 10.1	122.8	30 24.6	123.6	29 38.7	124.8	28 52.7	125.1	28 6.4	125.5
8	4	32 0.4	120.4	31 15.7	121.2	30 30.8	122.0	29 45.5	122.7	29 0.1	123.5	28 14.4	124.2	27 28.4	124.9
12	4	31 20.0	119.5	30 35.7	120.3	29 51.0	121.1	29 6.1	121.9	28 20.9	122.6	27 35.6	123.4	26 50.0	124.1
16	4	30 39.2	118.7	29 55.2	119.5	29 10.9	120.2	28 26.3	121.0	27 41.5	121.8	26 56.5	122.5	26 11.2	123.2
20	4	29 58.1	117.8	29 14.5	118.6	28 30.4	120.4	27 46.2	120.4	27 1.7	120.9	26 17.0	121.7	25 31.9	122.4
24	4	29 16.8	117.0	28 33.4	117.8	27 49.0	120.6	27 5.7	120.3	26 21.5	120.1	25 37.1	120.8	24 52.4	121.6
28	4	28 35.1	116.2	27 52.0	117.2	27 8.5	117.8	26 24.0	118.5	25 41.0	119.3	24 56.9	120.0	24 12.5	120.8
32	4	27 53.1	115.4	27 10.3	116.2	26 27.2	116.9	25 43.8	117.7	25 0.2	118.5	24 16.4	119.2	23 34.3	120.0
36	4	27 10.9	114.6	26 28.3	115.4	25 45.4	116.1	25 2.3	116.9	24 19.0	117.7	23 35.5	118.4	22 51.7	119.7
40	4	26 28.3	113.8	25 46.1	114.6	25 3.5	115.4	24 20.6	116.1	23 37.6	116.9	22 54.9	117.7	22 10.9	118.4
44	4	25 45.5	113.0	25 3.5	114.6	24 21.1	114.6	23 38.6	115.3	22 55.8	116.1	22 12.4	116.9	21 29.7	117.6
48	4	25 2.5	112.2	24 20.7	113.0	23 38.6	113.8	22 56.3	114.6	22 43.8	115.3	21 31.1	116.1	20 48.2	116.9
52	4	24 19.2	111.5	23 37.6	112.3	22 55.8	113.8	22 13.8	113.8	21 31.5	114.3	20 49.1	115.3	20 6.5	116.1
56	4	23 35.7	110.7	22 54.4	111.5	22 12.8	112.3	21 31.0	113.1	20 49.0	113.8	20 6.9	114.6	19 24.5	115.3
4 0	4	22 55.0	110.0	22 10.9	110.8	21 29.5	111.5	20 48.0	112.3	20 6.2	113.1	19 24.3	113.8	18 42.2	114.6
4	4	22 8.0	109.2	21 27.2	110.0	20 46.0	110.8	20 4.8	111.6	19 23.2	112.3	18 41.6	113.1	17 59.7	113.9
8	4	21 23.9	108.5	20 43.2	109.3	20 2.3	110.1	19 21.2	110.8	18 40.0	111.6	17 58.7	112.4	17 16.9	113.1
12	4	20 39.6	107.8	19 59.1	108.6	19 18.4	109.4	18 37.6	110.1	17 56.5	110.9	17 15.4	111.7	16 33.9	112.4
16	4	19 55.1	107.1	19 14.8	107.9	18 34.3	108.6	17 53.8	109.4	17 12.9	110.2	16 32.0	110.9	15 50.7	111.7
20	4	19 10.4	106.4	18 30.4	107.1	17 50.1	107.9	17 9.7	108.7	16 29.0	109.5	15 48.3	110.2	15 7.3	111.0
24	4	18 25.6	105.7	17 45.7	106.4	17 5.6	107.2	16 25.3	108.0	15 44.9	108.8	15 4.4	109.5	14 23.6	110.3
28	4	17 40.6	105.0	17 1.0	105.7	16 21.1	106.5	15 41.0	107.3	15 0.7	108.1	14 20.4	108.8	13 39.8	109.6
32	4	16 55.5	104.3	16 16.0	105.1	15 36.2	105.8	14 56.3	106.6	14 16.3	107.4	13 36.1	108.1	12 55.8	108.9
36	4	16 10.3	103.6	15 30.8	104.4	14 51.3	105.2	14 11.6	105.9	13 31.7	106.7	12 51.7	10		

SOUTH DECLINATION.

Hour Angle.		7°		8°		9°		10°		11°		12°	
		Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.
h.	m.												
0	0	44 0.0	180.0	43 0.0	180.0	42 0.0	180.0	41 0.0	180.0	40 0.0	180.0	39 0.0	180.0
0	4	43 59.5	178.6	42 59.5	178.7	41 59.5	178.7	40 59.5	178.7	39 59.4	178.7	38 59.4	178.7
8	8	43 57.8	177.2	42 57.9	177.3	41 57.9	177.3	40 58.0	177.4	39 58.0	177.4	38 58.0	177.5
12	12	43 55.0	175.9	42 55.1	175.9	41 55.2	176.0	40 55.2	176.1	39 55.2	176.2	38 55.3	176.3
16	16	43 51.1	174.5	42 51.3	174.6	41 51.4	174.7	40 51.6	174.8	39 51.7	174.9	38 51.8	175.0
20	43 46.6	173.1	42 46.3	173.3	41 46.5	173.4	40 46.6	173.5	39 47.0	173.6	38 47.2	173.7	
24	43 39.9	171.8	42 40.3	171.9	41 40.7	172.1	40 41.0	172.2	39 41.3	172.3	38 41.6	172.5	
28	43 32.7	170.4	42 33.2	170.6	41 33.6	170.7	40 34.1	170.9	39 34.6	171.1	38 35.0	171.2	
32	43 24.4	169.0	42 25.0	169.2	41 25.7	169.4	40 26.2	169.6	39 26.8	169.8	38 27.3	170.0	
36	43 14.9	167.7	42 15.8	167.9	41 16.5	168.1	40 17.3	168.4	39 18.0	168.6	38 18.8	168.8	
40	43 4.5	166.4	42 5.5	166.6	41 6.4	166.9	40 7.4	167.1	39 8.3	167.3	38 9.1	167.5	
44	42 53.0	165.0	41 54.2	165.3	40 55.3	165.6	39 56.5	165.8	38 57.6	166.1	37 58.6	166.3	
48	42 40.4	163.7	41 41.8	164.0	40 43.2	164.3	39 44.6	164.6	38 45.9	164.8	37 47.1	165.1	
52	42 26.8	162.4	41 28.5	162.7	40 30.1	163.0	39 31.7	163.3	38 33.2	163.6	37 34.7	163.9	
56	42 12.1	161.1	41 14.1	161.4	40 16.0	161.8	39 17.7	162.1	38 19.5	162.4	37 21.2	162.7	
1	0	41 56.5	159.8	40 58.8	160.2	40 0.9	160.5	39 2.9	160.8	38 4.9	161.2	37 6.9	161.5
4	41 40.0	158.5	40 42.4	158.9	39 44.9	159.3	38 47.2	159.6	37 49.5	160.0	36 51.7	160.3	
8	41 22.4	157.3	40 25.2	157.7	39 27.9	158.0	38 30.5	158.4	37 33.0	158.8	36 35.5	159.1	
12	41 3.9	156.0	40 7.0	156.4	39 10.6	156.8	38 12.8	157.2	37 15.7	157.6	36 18.4	158.0	
16	40 44.5	154.8	39 47.8	155.2	38 51.1	155.6	37 54.3	156.0	36 57.4	156.4	36 0.5	156.8	
20	40 24.2	153.5	39 27.9	154.0	38 31.5	154.4	37 35.0	154.9	36 38.4	155.3	35 41.7	155.7	
24	40 2.9	152.3	39 7.0	152.8	38 10.9	153.2	37 14.7	153.7	36 18.5	154.1	35 22.1	154.5	
28	39 46.8	151.4	38 45.3	151.9	37 49.5	152.1	36 53.0	152.5	35 57.7	153.0	35 1.6	153.4	
32	39 17.9	149.9	38 22.6	150.4	37 27.3	150.9	36 31.7	151.4	35 36.1	151.9	34 40.3	152.3	
36	38 54.1	148.8	37 59.2	149.3	37 4.2	149.8	36 30.0	150.3	35 13.7	150.7	34 18.3	151.2	
40	38 29.5	147.6	37 35.0	148.1	36 40.3	148.6	35 45.5	149.1	34 50.5	149.6	33 55.5	150.1	
44	38 4.1	146.5	37 9.9	147.0	36 15.6	147.5	35 21.2	148.0	34 26.6	148.5	33 31.9	149.1	
48	37 38.0	145.3	36 44.7	145.9	35 50.2	146.4	34 56.1	147.0	34 3.8	147.5	33 7.4	148.0	
52	37 11.1	144.2	36 17.6	144.8	35 24.1	145.3	34 30.3	145.9	33 36.4	146.4	32 14.4	146.9	
56	36 43.4	143.1	35 50.4	143.7	34 57.2	144.3	34 3.8	144.8	33 10.3	145.4	32 16.6	145.9	
2	0	36 15.0	142.0	35 22.4	142.6	34 29.5	143.2	33 36.5	143.8	32 43.4	144.3	31 50.1	144.9
4	35 46.6	141.5	34 44.5	142.1	34 1.3	142.6	33 8.6	143.2	32 15.9	143.7	31 22.9	144.3	
8	35 16.3	139.9	34 24.5	140.5	33 32.4	141.1	32 40.1	141.7	31 47.6	142.3	30 55.0	142.8	
12	34 45.9	138.9	33 54.5	139.5	33 2.8	140.1	32 10.9	140.7	31 18.7	141.3	30 26.6	141.8	
16	34 14.9	137.8	33 23.8	138.5	32 32.5	139.1	31 41.0	139.7	30 49.2	140.3	29 57.4	140.9	
20	33 43.3	136.8	32 52.6	137.4	32 1.6	138.1	31 10.5	138.7	30 19.2	139.3	29 27.7	139.9	
24	33 11.1	135.8	32 20.7	136.5	32 30.2	137.1	30 39.4	137.7	29 48.5	138.3	28 57.3	138.9	
28	32 38.3	134.8	31 48.3	135.5	30 58.1	136.1	30 7.7	136.8	29 17.2	137.4	28 26.4	138.0	
32	32 5.0	133.9	31 15.4	134.5	30 25.6	135.2	29 35.5	135.8	28 45.3	136.4	27 54.9	137.0	
36	31 31.1	132.9	30 41.8	133.6	29 52.4	134.2	29 2.7	134.9	28 12.9	135.5	27 22.8	136.1	
40	30 56.6	131.9	30 7.8	132.6	29 18.7	133.3	28 29.4	133.9	27 40.0	134.6	26 50.3	135.2	
44	30 21.7	131.0	29 33.2	131.7	28 44.4	132.4	27 55.5	133.0	27 6.4	133.7	26 17.1	134.3	
48	29 46.7	130.1	28 58.1	130.8	28 9.8	131.4	27 12.2	132.1	26 32.5	132.8	25 43.5	133.4	
52	29 10.3	129.2	28 22.6	129.9	27 14.6	130.5	26 46.4	131.2	25 58.0	131.9	25 9.4	132.5	
56	28 34.0	128.3	27 46.6	129.0	26 58.9	129.7	26 11.1	130.3	25 23.0	131.0	24 34.8	131.7	
3	0	27 57.1	127.4	27 10.1	128.1	26 22.8	128.8	25 35.3	129.5	24 47.6	130.1	23 59.8	130.8
4	27 19.0	126.5	26 33.2	127.2	25 46.2	127.9	24 59.1	128.6	24 11.8	129.3	23 24.2	130.0	
8	26 42.2	125.7	25 55.8	126.4	25 9.2	127.1	24 22.4	127.8	23 35.4	128.4	22 48.3	129.1	
12	26 4.1	124.8	25 18.1	125.5	24 11.8	126.2	23 45.4	126.9	22 58.7	127.6	22 1.9	128.3	
16	25 25.6	124.0	24 39.9	124.7	23 54.0	125.4	23 7.9	126.1	22 21.0	126.8	21 35.0	127.5	
20	24 46.8	123.1	24 1.4	123.8	23 15.8	124.6	22 30.0	125.3	21 44.0	126.0	20 57.8	126.6	
24	24 23.3	122.3	23 22.5	123.0	22 37.2	123.7	21 51.7	124.5	21 6.0	125.2	20 20.2	125.8	
28	23 7.9	121.5	22 43.2	122.2	21 58.2	122.9	21 13.0	123.7	20 27.7	124.4	20 27.7	125.4	
32	22 48.1	120.7	22 3.6	121.4	21 19.0	122.1	20 34.1	122.9	19 49.1	123.6	19 3.8	124.3	
36	22 7.8	119.9	21 23.6	120.6	20 39.3	121.4	19 54.7	122.1	19 10.1	122.8	18 55.1	123.5	
40	21 27.2	119.1	20 43.4	119.9	19 59.3	120.6	19 15.1	121.3	18 30.6	122.0	17 46.1	122.7	
44	20 46.3	118.4	20 2.7	119.1	19 19.0	119.8	18 35.1	120.5	17 50.9	121.3	17 6.7	122.0	
48	20 5.1	117.6	19 21.8	118.3	18 38.4	119.1	17 54.7	119.8	17 10.9	120.5	16 26.9	121.2	
52	19 23.7	116.8	18 40.7	117.6	17 57.5	118.3	17 14.1	119.0	16 30.5	119.7	15 40.9	120.5	
56	18 41.9	116.0	18 59.2	116.8	17 16.3	117.6	16 33.2	118.3	15 49.9	119.0	15 6.6	119.7	
4	0	18 0.0	115.3	17 17.4	116.1	16 34.8	116.8	15 52.0	117.6	15 9.0	118.3	14 25.9	119.0
8	17 17.7	114.6	16 35.4	115.4	15 33.7	116.1	15 10.5	116.8	14 27.8	117.6	13 45.0	118.3	
12	16 35.1	113.9	15 53.1	114.6	15 11.0	115.4	14 28.7	116.1	13 46.3	116.8	13 3.8	117.6	
16	15 52.4	113.2	15 10.7	113.9	14 28.9	114.7	13 46.8	115.4	13 4.7	116.1	12 22.3	116.9	
20	15 9.4	112.4	14 27.9	113.2	13 46.3	113.9	13 4.5	114.7	12 22.6	115.4	11 40.6	116.2	
24	14 26.2	111.7	13 45.0	112.5	13 3.6	113.2	12 22.0	114.0	11 40.4	114.7	10 58.6	115.5	
28	13 43.8	111.0	13 1.8	111.7	12 31.3	112.4	11 39.4	113.1	10 57.9	114.0	10 16.4	114.8	
32	12 59.2	110.3	12 18.4	111.1	11 37.4	111.9	10 56.3	112.6	10 15.2	113.3	9 33.9	114.1	
36	12 15.3	109.7	11 34.8	110.4	10 54.1	111.2	10 13.2	111.9	9 32.2	112.7	8 51.2	113.4	
40	11 31.3	109.0	10 51.0	109.7	10 10.5	110.5	9 29.8	111.2	8 49.1	112.0	8 8.3	112.7	
44	10 47.1	108.3	10 6.9	109.1	9 26.7	109.8	8 56.2	110.6	8 5.8	111.3	7 25.2	112.1	
48	10 2.7	107.6	9 22.8	108.4	8 42.7	109.1	8 2.5	109.9	7 22.2	110.6	6 47.0	111.4	
52	9 18.9	107.0	8 38.4	107.7	7 58.6	108.5	7 18.5	109.2	6 38.5	110.0	5 58.4	110.7	
56	8 33.6	106.3	7 53.9	107.1	7 14.2	107.8	6 34.4	108.6	5 54.0	109.3	5 18.1	110.1	
5	0	7 48.8	105.6	7 9.3	106.4	6 29.8	107.1	5 50.2	107.9	5 10.5	108.7	4 30.7	109.4
4	7 3.8	105.0	6 24.5	105.7	5 45.2	106.5	5 5.7	107.3	4 26.3	108.0	3 46.7	108.8	
8	6 18.7	104.3	5 39.6	105.1	5 0.3	105.8	4 21.1	106.6	3 41.8	107.4	3 2.4	108.1	
12	5 33.4	103.7	4 54.4	104.4	4 15.4	105.2	3 36.3	106.0	2 57.2	106.7	2 18.1	107.5	
16	4 48.0	103.0	4 9.2	103.8	3 30.3	104.6	2 51.4	105.3	2 12.5	106.1	1 33.5	106.8	
20	4 2.6	102.4	3 23.9	103.2	2 45.2	103.9	2 6.4	104.7	1 27.6	105.4	0 48.8	106.2	
24	3 16.9	101.7	2 38.4	102.5	1 59.8	103.3	1 21.2	104.1	0 42.6	104.8	0 4.0	105.6	
28	2 31.3	101.0	1 52.9										

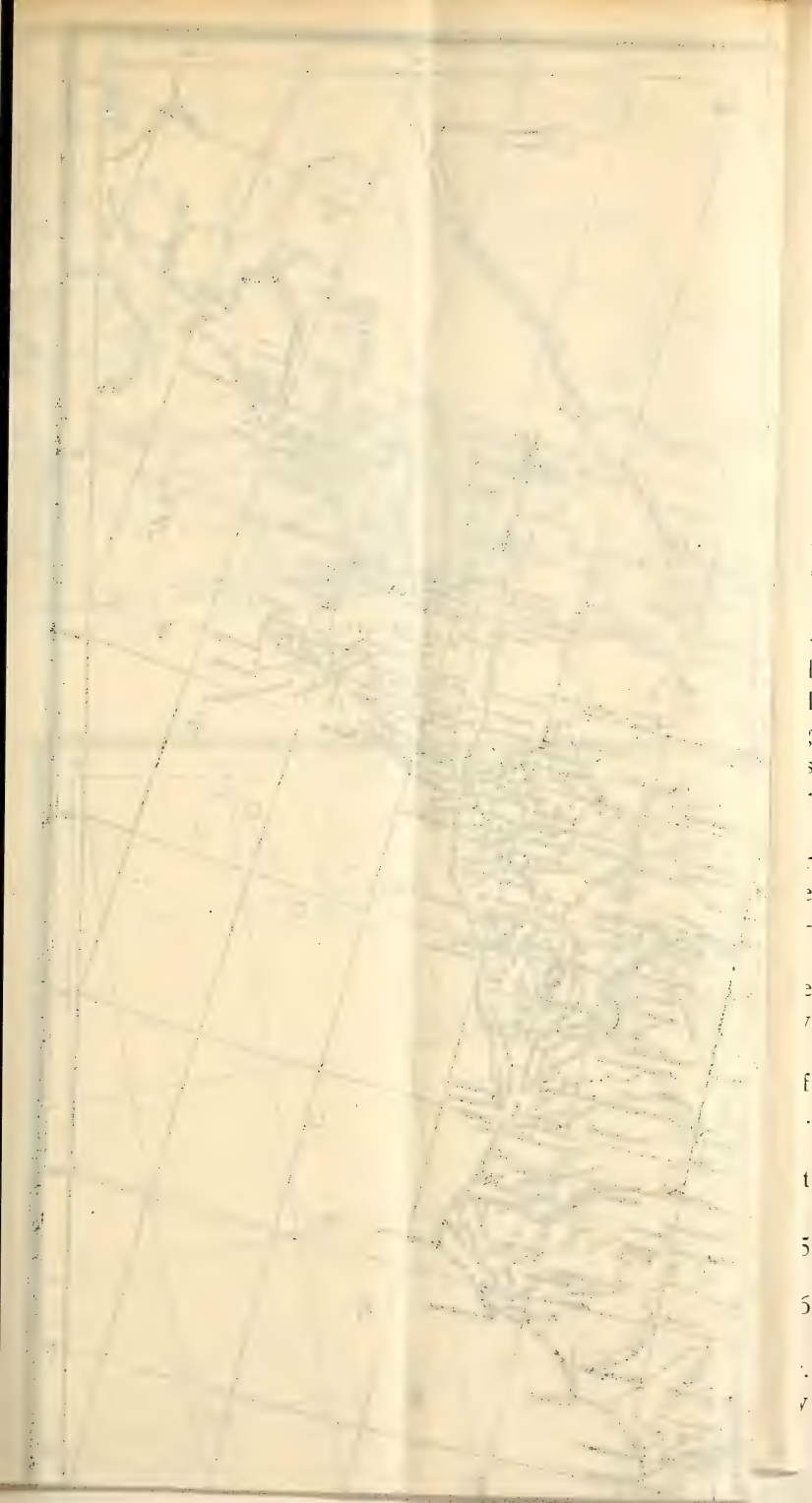
SOUTH DECLINATION.													
Hour Angle.		13°		14°		15°		16°		17°		18°	
		Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.
h. m.	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
0	38 0.0	180.0	37 0.0	180.0	36 0.0	180.0	35 0.0	180.0	34 0.0	180.0	33 0.0	180.0	32 0.0
4	37 58.0	178.8	36 58.1	177.6	35 58.5	176.8	34 58.1	176.6	33 58.2	176.0	32 58.2	175.4	174.8
8	37 55.4	176.3	36 55.5	176.4	35 55.6	176.4	34 55.7	176.5	33 55.8	176.5	32 55.9	176.6	176.6
12	37 51.9	173.8	36 52.1	175.1	35 52.2	175.2	34 52.3	175.3	33 52.5	175.4	32 52.7	175.5	175.5
16													
20	37 47.4	173.1	36 47.6	173.9	35 47.8	174.0	34 48.0	174.1	33 48.2	174.2	32 48.5	174.6	174.6
24	37 50.4	172.6	36 49.3	172.7	35 49.2	172.9	34 49.9	173.0	33 49.2	173.1	32 49.5	173.1	173.1
28	37 45.9	171.4	36 35.9	171.5	35 36.2	171.7	34 36.6	171.8	33 37.0	172.0	32 37.5	172.1	172.1
32	37 27.9	170.2	36 28.5	170.3	35 29.0	170.5	34 29.5	170.7	33 30.1	170.8	32 30.6	171.0	171.0
36	37 19.5	169.0	36 20.2	169.1	35 20.9	169.3	34 21.5	169.5	33 22.2	169.7	32 22.8	169.9	169.9
40	37 10.0	167.8	36 10.9	168.0	35 11.7	168.2	34 12.5	168.4	33 13.4	168.6	32 14.2	168.7	168.7
44	36 59.7	166.6	36 0.7	166.8	35 1.7	167.0	34 2.7	167.2	33 3.6	167.4	32 4.6	167.6	167.6
48	36 48.3	165.4	35 49.6	165.6	34 50.8	165.8	33 51.9	166.1	32 53.1	166.3	31 54.2	166.5	166.5
52	36 36.1	164.2	35 37.5	164.4	34 38.9	164.7	33 40.3	164.9	32 41.6	165.2	31 42.9	165.4	165.4
56	36 22.8	163.0	35 24.5	163.3	34 26.1	163.5	33 27.7	163.8	32 29.2	164.1	31 30.7	164.3	164.3
1	0	36 8.8	161.8	35 16.6	162.1	34 19.4	162.4	33 14.4	162.7	32 16.0	163.1	31 17.7	163.3
4	35 53.9	160.6	34 55.9	161.0	33 57.9	161.3	32 59.9	161.6	32 1.9	161.9	31 1.9	162.1	162.1
8	35 37.9	159.4	34 40.3	159.8	33 42.6	160.2	32 44.8	160.5	31 47.0	160.8	30 49.2	161.1	161.1
12	35 21.5	158.3	34 23.8	158.7	33 26.3	159.0	32 28.8	159.4	31 31.3	159.7	30 33.7	160.1	160.1
16	35 3.5	157.2	34 6.4	157.6	33 9.2	157.9	32 12.0	158.3	31 14.8	158.6	30 17.4	159.0	159.0
20	34 45.0	156.1	33 48.1	156.5	32 51.3	156.8	31 54.4	157.2	30 57.4	157.6	30 0.3	157.9	157.9
24	34 25.7	155.0	33 29.1	155.4	32 32.5	155.8	31 35.9	156.1	30 39.2	156.5	29 42.4	156.9	156.9
28	34 5.8	153.9	33 9.5	154.3	31 53.1	154.7	31 16.6	155.1	30 20.2	155.5	29 23.7	155.9	155.9
32	33 44.5	152.8	32 48.6	153.2	31 52.7	153.6	30 56.6	154.0	30 0.5	154.4	29 4.3	154.8	154.8
36	33 22.8	151.7	32 27.2	152.1	31 31.6	152.6	30 35.8	153.3	29 40.0	153.4	28 44.0	153.8	153.8
40	33 0.3	150.6	32 5.1</										

SOUTH DECLINATION

Hour Angle.		19°		20°		21°		22°		23°		24°	
		Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.
h.	m.	°	'	°	'	°	'	°	'	°	'	°	'
0	0	32	0.0	180.0	31	0.0	180.0	29	0.0	180.0	28	0.0	180.0
4	0	31	59.6	178.9	30	59.6	178.9	29	59.6	178.9	27	59.6	178.9
8	0	31	58.3	177.8	30	58.3	177.8	28	58.3	177.8	27	58.3	177.9
12	0	31	56.6	176.7	30	56.1	176.7	28	56.1	176.8	27	56.2	176.9
16	0	31	54.8	175.5	30	53.0	175.6	28	53.2	175.8	27	53.2	175.9
20	0	31	48.7	174.4	30	48.9	174.5	28	49.1	174.6	27	49.4	174.8
24	0	31	43.7	173.3	30	44.0	173.4	28	44.3	173.6	27	44.8	173.8
28	0	31	38.7	172.2	30	38.2	172.4	28	38.6	172.6	27	39.3	172.7
32	0	31	31.1	171.1	30	31.6	171.3	28	32.1	171.4	27	33.0	171.8
36	0	31	23.5	170.0	30	24.1	170.2	28	24.7	170.4	27	25.8	170.7
40	0	31	14.9	168.9	30	15.7	169.1	28	17.8	169.5	27	17.9	169.6
44	0	31	5.5	167.8	30	6.4	168.0	28	7.3	168.2	27	9.0	168.6
48	0	30	55.3	166.8	29	56.4	167.0	28	57.4	167.2	26	59.5	167.6
52	0	30	44.2	165.7	29	45.4	165.9	28	46.7	166.1	26	49.0	166.5
56	0	30	32.2	164.6	29	33.7	164.8	28	35.1	165.1	26	37.8	165.5
1	0	30	19.4	163.5	29	21.1	163.8	28	22.7	164.1	26	25.8	164.6
4	0	30	5.8	162.5	29	7.7	162.8	28	9.5	163.0	26	13.0	162.8
8	0	29	51.4	161.4	28	52.5	161.7	27	55.5	162.0	25	59.2	162.6
12	0	29	36.1	160.4	28	38.4	160.7	27	40.7	161.0	25	45.1	161.6
16	0	29	20.1	159.3	28	22.6	159.7	27	25.1	160.0	25	29.9	160.6
20	0	29	3.1	158.3	28	5.9	158.6	27	8.7	159.0	25	14.1	159.6
24	0	28	45.6	157.3	27	48.7	157.6	26	51.7	158.3	24	57.1	158.7
28	0	28	27.1	156.3	27	30.5	156.6	26	33.8	157.0	24	40.1	157.7
32	0	28	8.0	155.2	27	11.6	155.6	26	15.2	156.0	24	23.1	156.8
36	0	27	48.0	154.2	26	52.0	154.6	25	55.9	155.4	24	3.4	155.2
40	0	27	27.5	153.2	26	31.7	153.7	25	35.8	154.1	24	39.9	154.5
44	0	27	6.1	152.3	26	10.6	152.7	25	15.3	153.1	24	19.4	153.5
48	0	26	44.0	151.3	25	48.8	151.7	24	53.6	152.2	23	58.3	152.6
52	0	26	21.3	150.3	25	26.4	150.8	24	31.5	151.2	23	36.5	151.7
56	0	25	57.8	149.3	25	3.3	149.8	24	8.7	150.3	23	14.0	150.7
2	0	25	33.7	148.4	24	39.5	148.9	23	45.3	149.4	22	56.4	150.3
4	0	25	9.0	147.5	24	15.1	147.9	23	21.2	148.4	22	27.1	148.9
8	0	24	43.6	146.5	23	50.1	147.0	22	56.5	147.5	21	8.9	148.5
12	0	24	17.5	145.6	23	24.3	146.1	22	31.0	146.6	21	37.7	147.1
16	0	23	50.9	144.7	22	58.1	145.2	22	5.1	145.7	21	12.1	146.2
20	0	23	23.6	143.8	22	31.1	144.3	21	38.5	144.8	20	45.8	145.3
24	0	22	55.8	142.9	22	3.6	143.4	21	11.4	144.0	20	19.0	144.5
28	0	22	27.4	142.0	21	35.5	142.6	20	43.0	143.1	19	51.6	143.6
32	0	21	58.4	141.1	21	6.9	141.7	20	15.3	142.2	19	23.7	142.8
36	0	21	28.8	140.3	20	37.7	140.8	19	46.5	141.4	18	55.1	141.9
40	0	20	56.6	139.4	20	7.9	140.0	19	17.1	140.5	18	26.2	141.1
44	0	20	28.1	138.6	19	37.7	139.1	18	47.2	139.7	17	56.6	140.3
48	0	20	5.9	137.7	19	7.0	138.3	18	16.9	138.9	17	26.6	139.5
52	0	19	25.3	136.9	18	35.6	137.5	17	45.9	138.1	16	56.0	138.6
56	0	18	53.2	136.0	18	3.9	136.7	17	14.4	137.2	16	24.9	137.8
3	0	18	20.6	135.2	17	31.6	135.8	16	42.6	136.4	15	53.3	137.0
4	0	17	47.5	134.4	16	58.9	135.0	16	10.2	135.6	15	21.3	136.2
8	0	17	13.9	133.6	16	25.0	134.2	15	37.3	134.9	14	48.8	135.5
12	0	16	40.0	132.8	15	52.1	133.5	15	4.1	134.1	14	15.9	134.7
16	0	16	5.6	132.0	15	18.0	132.7	14	30.3	133.3	13	42.5	133.9
20	0	15	30.7	131.3	14	43.5	131.9	13	56.2	132.5	13	8.7	133.2
24	0	14	55.5	130.5	14	8.0	131.1	13	21.6	131.8	12	34.5	132.4
28	0	14	19.8	129.7	13	33.3	130.4	12	46.7	131.0	11	59.9	131.7
32	0	13	43.8	129.0	12	57.0	129.6	12	11.3	130.3	11	24.9	130.9
36	0	13	7.3	128.2	12	21.4	128.9	11	35.5	129.6	10	49.4	130.2
40	0	12	30.6	127.5	11	45.0	128.2	10	59.4	128.8	10	13.6	129.5
44	0	11	53.3	126.8	11	8.2	127.5	10	22.9	128.1	9	37.5	128.8
48	0	11	15.8	126.1	10	31.0	126.7	9	46.0	127.4	9	9.9	128.1
52	0	10	37.9	125.3	9	53.4	126.0	9	8.8	126.7	8	24.0	127.4
56	0	9	59.7	124.6	9	15.5	125.3	8	31.2	126.0	7	46.8	126.7
4	0	9	21.2	123.9	8	37.1	124.6	7	53.3	125.3	7	9.2	126.0
8	0	8	42.4	123.2	7	58.8	123.9	7	15.1	124.6	6	31.4	125.3
12	0	8	3.2	122.5	7	19.9	123.2	6	36.5	123.9	5	53.1	124.6
16	0	7	23.7	121.8	6	40.7	122.6	5	57.7	123.3	5	14.6	124.0
20	0	6	53.9	121.3	6	1.3	121.9	5	18.6	122.6	4	35.7	123.3
24	0	6	3.9	120.5	5	21.6	121.2	4	39.1	121.9	3	56.6	122.6
28	0	5	23.6	119.8	4	41.5	120.5	3	59.4	121.3	3	17.2	122.0
32	0	4	43.0	119.2	4	1.2	119.9	3	19.4	120.6	2	37.5	121.3
36	0	4	2.1	118.5	3	20.6	119.2	2	39.1	120.0	1	57.5	120.7
40	0	3	21.0	117.9	2	39.8	118.6	1	58.6	119.3	1	17.3	120.0
44	0	2	39.7	117.3	1	58.7	117.9	1	17.8	118.7	0	36.8	119.4
48	0	1	58.1	116.6	1	17.5	117.3	0	36.8	118.0			
52	0	1	16.3	115.9	0	35.9	116.7						
56	0	0	34.2	115.3									
4	0												
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48	0												
52	0												
56	0												
6	0												

Hour Angle	α Tauri Aldebaran		β Orionis Rigel		α Aurigæ Capella		α Orionis Betelgeux		α Can. Major Sirius		α Can. Min. Procyon		β Gemin. Pollux	
	Dec. +16° 20' 8"		Dec. -8° 17' 7"		Dec. +45° 55' 0"		Dec. +7° 23' 6"		Dec. -16° 36' 3"		Dec. +5° 26' 0"		Dec. +28° 13' 4"	
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.
h. m. s.														
0 0	67 16.8	180.0	42 42.3	180.0	83 5.0	0.0	58 23.6	180.0	34 23.7	180.0	56 26.0	180.0	79 13.4	180.0
4	67 16.7	177.5	42 41.8	177.8	83 2.6	5.8	58 22.9	178.1	34 23.2	178.8	56 25.4	178.2	79 11.3	175.2
8	67 16.8	175.0	42 40.2	177.7	82 55.7	11.4	58 20.7	176.2	34 21.9	177.7	56 23.2	176.4	79 5.7	170.6
12	67 11.7	172.5	42 37.4	176.0	82 44.2	16.8	58 16.8	174.3	34 19.5	176.0	56 19.6	174.6	78 56.4	160.4
16	67 4.7	170.1	42 33.6	174.6	82 28.8	21.8	58 11.5	172.5	34 16.1	175.4	56 14.4	172.8	78 43.4	160.4
20	66 55.6	167.7	42 28.6	173.3	82 9.8	26.4	58 4.6	170.6	34 11.8	174.2	56 7.8	171.0	78 27.2	157.4
24	66 44.5	165.3	42 27.7	172.0	81 47.6	30.6	57 50.2	168.7	34 6.8	173.1	56 0.0	169.3	78 7.7	153.4
28	66 31.9	162.9	42 15.6	170.6	81 22.4	34.4	57 40.3	167.9	34 0.5	171.9	55 50.5	167.5	77 45.3	149.6
32	66 17.3	160.6	42 7.5	168.3	80 54.9	37.8	57 35.0	165.1	33 53.6	170.8	55 38.8	165.8	77 20.5	146.0
36	66 1.0	158.3	41 58.3	166.0	80 25.3	40.9	57 22.4	163.3	33 45.6	169.6	55 27.6	164.1	77 53.3	142.4
40	65 42.9	156.1	41 48.1	166.7	79 53.9	43.6	57 8.3	161.5	33 36.7	168.5	55 14.1	162.4	76 24.0	139.0
44	65 23.2	153.9	41 36.8	165.4	79 21.0	45.9	56 52.8	159.7	33 26.9	166.7	54 59.2	160.7	75 52.8	136.4
48	65 1.9	151.8	41 24.5	164.1	78 40.9	48.0	56 35.9	158.0	33 16.3	165.4	54 53.2	159.0	75 19.7	133.6
52	64 39.2	149.7	41 11.3	161.8	77 11.7	49.9	56 17.8	156.3	33 4.0	165.1	54 25.8	157.4	74 45.3	131.0
0 56	64 14.9	147.7	40 57.0	161.5	77 35.8	51.6	55 58.4	154.6	32 52.3	164.0	54 7.3	155.7	74 9.5	128.7
1 0	63 49.3	145.7	40 41.7	160.3	76 58.9	53.1	55 37.9	153.0	32 39.0	162.9	53 47.6	154.1	73 32.5	126.6
4	63 22.4	143.8	40 25.2	159.0	76 21.2	54.4	55 16.0	151.3	32 24.8	161.3	53 26.7	152.6	72 54.3	124.2
8	62 54.3	142.0	40 8.3	157.8	75 43.0	55.6	54 53.1	149.7	32 9.8	160.7	53 4.0	151.0	72 15.2	121.8
12	62 24.9	140.2	39 50.2	156.5	75 4.3	56.6	54 29.6	148.2	31 54.0	159.5	52 41.5	149.5	71 35.5	119.2
16	61 54.5	138.4	39 31.1	155.3	74 25.3	57.5	54 3.9	146.6	31 37.4	158.6	52 17.2	148.0	70 55.0	116.8
20	61 23.1	136.7	39 11.3	154.1	73 45.6	58.3	53 37.8	145.1	31 19.9	157.4	51 52.0	146.5	70 13.7	114.0
24	60 50.6	135.1	38 50.5	152.9	73 5.7	59.0	53 10.6	143.6	31 1.6	156.4	51 35.9	145.1	69 31.8	111.4
28	60 17.3	133.5	38 28.5	151.7	72 48.8	59.7	52 42.5	142.3	30 42.5	155.3	51 20.6	143.7	68 40.5	108.8
32	59 43.0	132.0	38 6.3	150.6	71 45.4	60.3	52 13.4	140.8	30 22.6	154.3	51 30.6	142.3	68 6.8	106.2
36	59 8.0	130.5	37 43.0	149.4	71 4.7	60.8	51 43.5	139.4	30 2.0	153.2	50 1.6	140.9	67 23.5	103.6
40	58 32.1	129.0	37 18.9	148.3	70 23.8	61.2	51 12.7	138.0	29 40.6	152.2	49 31.8	139.6	66 39.8	101.0
44	57 55.5	127.2	36 53.5	147.3	69 49.9	61.9	50 41.2	136.9	29 18.6	151.1	49 15.1	138.5	65 56.5	98.4
48	57 18.2	125.6	36 28.3	146.0	69 2.0	62.0	50 8.7	135.4	28 55.7	150.2	48 39.8	137.0	65 11.1	95.8
52	56 40.3	124.0	36 1.8	144.9	68 20.8	62.3	49 35.5	134.1	28 32.2	149.2	47 57.6	135.7	64 26.9	93.2
0 56	56 1.8	123.6	35 34.7	143.9	67 39.4	62.5	49 1.7	132.8	28 8.0	148.2	47 24.7	134.5	63 42.1	90.6
1 0	55 22.7	122.4	35 6.8	142.8	66 58.8	62.8	48 27.2	131.6	27 43.2	147.2	46 51.0	133.1	62 57.0	88.0
4	54 43.0	121.2	34 38.3	141.7	66 16.7	63.0	47 52.2	130.4	27 19.6	146.3	46 16.8	132.0	62 11.1	85.4
8	54 2.9	120.0	34 9.1	140.7	65 34.8	63.1	47 16.2	129.3	26 51.4	145.3	45 41.9	130.9	61 26.3	82.8
12	53 22.3	118.8	33 39.2	139.7	64 53.3	63.2	46 39.8	128.1	26 24.5	144.3	45 6.4	129.8	60 40.8	80.2
16	52 41.2	117.7	33 8.6	138.6	64 11.8	63.3	46 2.8	127.0	25 57.0	143.4	44 30.3	128.7	59 55.0	77.6
20	51 59.7	116.6	32 37.6	137.6	63 30.1	63.4	45 25.3	125.9	25 28.9	142.5	44 53.7	127.6	59 9.0	75.0
24	51 17.9	115.6	32 5.8	136.6	62 48.2	63.5	44 47.3	124.8	25 0.2	141.6	44 18.6	126.5	58 23.0	72.4
28	50 35.6	114.5	31 33.5	135.7	62 6.6	63.5	44 8.8	123.7	24 31.0	140.7	43 36.4	125.5	57 36.9	69.8
32	49 53.1	113.5	31 0.7	134.7	61 24.7	63.5	43 29.8	122.7	24 1.1	139.8	42 54.4	124.4	56 50.7	67.2
36	49 10.2	112.5	30 27.2	133.8	60 43.0	63.5	42 50.2	121.7	23 30.8	138.9	42 21.8	123.4	56 4.4	64.6
40	48 26.9	111.6	29 53.3	132.8	60 1.3	63.5	42 10.1	120.7	22 59.8	138.0	40 42.6	122.4	55 18.0	62.0
44	47 43.4	110.6	29 18.8	131.9	59 19.6	63.5	41 30.1	119.7	22 28.3	137.1	40 3.0	121.4	54 31.7	59.4
48	46 59.6	109.7	28 43.8	131.0	58 38.0	63.4	40 49.3	118.7	21 56.3	136.3	39 23.1	120.5	53 45.2	56.8
52	46 15.6	108.8	28 8.4	130.1	57 56.2	63.4	40 8.3	117.8	21 23.8	135.4	38 42.7	119.5	52 58.6	54.2
0 56	45 31.3	107.9	27 35.3	129.2	57 14.6	63.3	39 26.8	116.9	20 50.9	134.6	38 2.0	118.6	52 12.1	51.6
1 0	44 47.0	107.1	26 56.1	128.3	56 32.9	63.2	38 45.1	116.0	20 17.4	133.7	37 20.8	117.7	51 25.6	49.0
4	44 2.2	106.2	26 19.3	127.4	55 51.4	63.1	38 3.0	115.1	19 43.5	132.9	36 39.3	116.8	50 39.0	46.4
8	43 17.4	105.4	25 42.1	126.6	55 9.7	63.0	37 20.6	114.2	19 9.2	132.0	35 57.6	115.9	49 52.3	43.8
12	42 32.3	104.6	25 4.4	125.7	54 28.2	62.8	36 37.9	113.3	18 34.3	131.3	35 15.5	115.1	49 5.7	41.2
16	41 47.1	103.8	24 26.4	124.9	53 46.8	62.7	35 54.9	112.5	17 59.1	130.5	34 33.1	114.2	48 19.0	38.6
20	41 1.7	103.0	23 47.9	124.1	53 5.4	62.6	35 11.7	111.6	17 23.4	129.7	33 50.4	113.4	47 32.5	36.0
24	40 16.3	102.2	23 9.1	123.2	52 24.0	62.4	34 28.2	110.8	16 47.3	128.9	33 7.4	112.5	46 45.8	33.4
28	39 30.6	101.5	22 29.9	122.4	51 42.8	62.2	33 44.5	110.0	16 10.9	128.2	32 24.3	111.7	45 59.2	30.8
32	38 44.9	100.7	21 50.4	121.6	51 1.5	62.1	33 6.7	109.2	15 34.0	127.4	31 40.8	110.9	45 12.6	28.2
36	37 59.0	99.9	21 10.5	120.9	50 20.3	61.9	32 16.5	108.4	14 56.7	126.6	30 57.2	110.1	44 26.0	25.6
40	37 13.0	99.2	20 30.4	120.1	49 39.3	61.7	31 32.1	107.6	14 19.2	125.9	30 13.2	109.3	43 39.5	23.0
44	36 26.9	98.5	19 49.8	119.3	48 58.2	61.5	30 47.6	106.9	13 41.2	125.2	29 29.2	108.5	42 53.0	20.4
48	35 40.8	97.8	19 10.0	118.5	48 17.3	61.3	30 2.9	106.1	13 2.9	124.4	28 44.6	107.8	42 6.5	17.8
52	34 54.6	97.1	18 28.0	117.8	47 36.4	61.1	29 18.0	105.4	12 24.3	123.7	28 0.4	107.0	41 20.1	15.2
0 56	34 8.4	96.4	17 46.5	117.0	46 55.7	60.8	28 32.9	104.6	11 45.4	123.0	27 15.6	106.3	40 33.7	12.6
1 0	33 22.0	95.7	17 4.8	116.3	46 15.0	60.6	27 47.8	103.9	11 5.9	122.3	26 30.8	105.5	39 47.4	10.0
4	32 35.5	95.0	16 22.9	115.6	45 34.4	60.4	27 2.4	103.2	10 26.4	121.6	25 45.8	104.8	39 1.2	7.4
8	31 49.0	94.4	15 40.7	114.8	44 54.0	60.1	26 17.0	102.4	9 46.6	120.9	25 0.7	104.1	38 14.9	5.0
12	31 2.5	93.7	14 58.4	114.1	44 13.7	59.9	25 31.3	101.7	9 6.4	120.2	24 15.3	103.4	37 28.7	2.4
16	30 16.0	92.4	14 15.6	113.4	43 33.4	59.6	24 45.6	101.0	8 26.0	119.5	23 30.0	102.7	36 42.7	0.0
20	29 29.4	91.4	13 32.8	112.7	42 53.1	59.4	23 59.9	100.3	7 45.3	118.8	22 44.4	102.0	35 56.7	-2.4
24	28 42.8	91.8	12 50.2	112.0	42 13.1	59.1	23 13.9	99.6	7 4.3	118.1	21 58.7	101.3	35 10.6	-5.0
28	27 56.2	91.1	12 6.3	111.3	41 32.4	58.9	22 27.9	99.0	6 23.0	117.4	21 12.9	100.6	34 24.5	-7.6
32	27 9.6	90.5	11 22.8	110.6	40 51.3	58.6	21 41.8	98.3	6 1.1	116.8	20 27.8	99.9	33 39.8	-10.0
36	26 23.0	89.9	10 39.0	110.0	40 13.6	58.3	20 55.6	97.6	4 59.8	116.1	19 41.1	99.2	32 53.3	-12.4
40	25 36.3	89.2	9 55.0	109.3	39 34.0	58.0	20 9.4	96.9	4 17.6	115.5	18 55.0	98.6	32 7.6	-15.0
44	24 49.7	88.6	9											

α Virginis Spica		α Bootis Arcturus		α Scorpii Antares		α Lyrae Vega		α Aquilae Altair		α Cygni Deneb		α Pisc. Aust. Fomalhaut		Hour Angle	
Dec. -10° 44' 3"		Dec. -19° 36' 3"		Dec. -26° 15' 2"		Dec. -38° 42' 4"		Dec. -8° 39' 2"		Dec. +44° 59' 4"		Dec. -33° 03' 2"			
Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.		
15.7	180.0	70 36.3	180.0	24 44.8	180.0	89 42.4	180.0	59 39.2	180.0	84 0.6	0	20 56.8	180.0	0	
15.7	178.7	70 35.3	177.1	24 44.4	179.0	89 4.7	110.3	59 38.4	178.0	83 57.8	6.7	20 56.4	179.0	4	
13.7	170.1	70 31.9	174.3	24 43.2	178.0	88 21.5	100.0	59 36.1	176.1	83 49.8	13.3	20 55.2	178.1	8	
13.0	176.1	70 26.2	171.5	24 41.7	177.0	87 36.3	96.2	59 32.1	174.1	83 36.5	19.4	20 53.4	177.2	12	
7.4	174.9	70 18.1	168.8	24 38.4	175.0	86 50.4	94.1	59 26.7	172.2	83 18.8	25.1	20 50.8	176.3	16	
2.6	173.6	70 7.9	166.0	24 34.8	173.0	86 4.1	92.7	59 19.5	170.3	82 57.0	30.2	20 47.3	175.4	20	
56.9	172.3	69 55.6	163.3	24 30.4	174.0	85 17.8	91.7	59 10.9	168.4	82 31.9	34.7	20 43.3	174.4	24	
56.2	171.0	69 41.1	160.7	24 25.2	173.0	84 31.4	90.9	59 0.8	166.5	82 4.0	38.7	20 38.4	173.5	28	
47.3	169.8	69 24.8	158.1	24 19.2	172.0	83 44.8	90.2	58 49.0	164.6	81 34.1	42.2	20 34.4	172.6	32	
33.5	168.5	69 6.3	155.6	24 12.7	171.1	82 58.2	89.6	58 36.0	162.7	81 1.9	45.2	20 30.4	171.7	36	
23.7	167.3	68 46.3	153.1	24 4.9	170.2	82 11.6	89.0	58 21.3	160.9	80 28.0	47.9	20 19.3	170.8	40	
13.1	166.0	68 24.2	150.8	23 56.5	169.2	81 25.2	88.5	58 5.5	159.1	79 52.9	50.2	20 11.4	169.8	44	
1.2	164.8	68 0.7	148.5	23 47.4	168.2	80 38.7	88.0	57 48.1	157.3	79 10.3	52.2	20 2.9	168.9	48	
14.7	163.5	67 35.5	146.2	23 37.5	167.2	79 52.1	87.6	57 39.5	155.6	78 39.1	54.0	19 53.5	168.0	52	
3.4	162.3	67 8.7	144.1	23 36.8	166.3	79 5.6	87.1	57 9.4	153.8	78 1.2	55.5	19 43.5	167.1	56	
20.1	161.1	66 40.7	142.0	23 15.5	165.4	78 19.2	86.7	56 48.3	152.2	77 22.4	56.9	19 32.8	166.2	1 0	
4.0	159.9	66 11.4	140.0	23 3.3	164.4	77 32.8	86.3	56 25.9	150.5	76 43.1	58.1	19 21.4	165.3	4	
12.1	158.7	65 40.8	138.0	22 59.4	163.5	76 46.3	85.9	56 2.4	148.9	76 3.3	59.1	19 9.3	164.4	8	
52.3	157.4	65 9.0	136.1	22 36.8	162.6	75 59.7	85.5	55 37.6	147.3	75 23.0	60.0	18 56.4	163.5	12	
12.3	156.4	64 36.2	134.3	22 22.4	161.6	75 13.2	85.1	55 11.9	145.7	74 42.4	60.8	18 42.9	162.6	16	
23.2	155.2	64 2.3	132.6	22 7.4	160.7	74 26.8	84.8	54 45.1	144.1	74 1.6	61.5	18 28.6	161.8	20	
32.4	154.0	63 27.0	130.9	21 51.0	159.7	73 40.5	84.4	54 17.3	142.6	73 20.6	62.2	18 13.8	160.9	24	
42.2	152.9	62 51.9	129.3	21 35.1	158.8	72 54.2	84.0	53 48.5	141.2	72 39.3	62.7	17 58.1	160.1	28	
50.7	151.7	62 15.5	127.7	21 17.8	157.9	72 7.8	83.7	53 18.7	139.7	71 57.7	63.2	17 41.9	159.2	32	
28.2	150.6	61 38.2	126.2	21 0.0	157.0	71 21.4	83.3	52 48.3	138.3	71 16.1	63.6	17 25.1	158.3	36	
4.9	149.5	61 0.3	124.7	20 41.5	156.1	70 35.1	82.9	52 16.8	136.9	70 34.2	64.0	17 7.6	157.5	40	
16.1	148.4	60 21.6	123.0	20 22.2	155.2	69 48.9	82.6	51 44.5	135.6	69 52.2	64.3	16 49.4	156.6	44	
10.6	147.4	59 42.4	122.0	20 3.3	154.3	69 2.7	82.2	51 11.5	134.3	69 10.2	64.6	16 30.6	155.8	48	
24.4	146.2	59 2.5	120.7	19 41.8	153.4	68 16.5	81.9	50 37.8	133.0	68 28.1	64.8	16 11.2	155.0	52	
57.4	145.2	58 22.2	119.4	19 20.6	152.6	67 30.3	81.5	50 3.3	131.7	67 45.8	65.0	15 51.1	154.1	56	
24.3	144.2	57 41.4	118.2	18 58.8	151.7	66 44.2	81.2	49 28.1	130.5	67 3.5	65.1	15 30.5	153.3	2 0	
7.9	143.1	57 0.0	117.0	18 36.4	150.8	65 58.3	80.8	48 52.4	129.3	66 21.3	65.3	15 9.2	152.5	4	
1.4	142.0	56 18.4	115.9	18 13.3	150.0	65 12.2	80.5	48 15.9	128.1	65 38.9	65.4	14 47.5	151.7	8	
2.8	140.1	55 36.2	114.7	17 49.6	149.1	64 26.3	80.1	47 38.9	126.9	64 56.4	65.4	14 25.0	150.9	12	
2.8	140.1	54 53.6	113.6	17 25.5	148.3	63 40.5	79.8	47 1.4	125.8	64 14.1	65.5	14 2.1	150.1	16	
1.9	139.1	54 10.7	112.6	17 0.7	147.4	62 54.6	79.4	46 23.4	124.7	63 31.6	65.5	13 38.5	149.3	20	
1.9	138.2	53 27.6	111.6	16 35.3	146.6	62 8.7	79.0	45 44.8	123.6	62 49.2	65.5	13 14.4	148.5	24	
26.0	137.2	52 44.6	110.6	16 4.4	145.8	61 22.2	78.7	45 5.9	122.4	62 6.7	65.5	12 49.7	147.7	28	
56.8	136.3	52 0.2	109.6	15 42.9	145.0	60 37.3	78.3	44 26.2	121.5	61 24.7	65.5	12 24.6	146.9	32	
26.0	135.3	51 16.2	108.6	15 16.0	144.2	59 51.7	78.0	43 46.2	120.5	60 42.0	65.4	12 0.0	146.2	36	
53.0	134.4	50 31.9	107.7	14 48.4	143.4	59 6.1	77.6	43 5.8	119.5	59 59.6	65.4	11 36.6	145.4	40	
45.3	133.5	49 47.3	106.8	14 20.4	142.6	58 20.2	77.3	42 25.1	118.5	59 17.2	65.3	11 5.9	144.6	44	
45.7	132.6	49 2.0	105.9	13 51.8	141.8	57 35.2	76.9	41 43.9	117.4	58 34.7	65.2	10 38.7	143.9	48	
35.6	131.7	48 17.7	105.0	13 22.7	141.0	56 49.8	76.6	41 2.4	116.6	57 52.4	65.1	10 11.0	143.1	52	
35.6	130.8	47 32.6	104.2	12 53.1	140.3	56 4.5	76.2	40 20.5	115.7	57 10.1	65.0	9 42.8	142.4	56	
44.2	129.1	46 47.2	103.4	12 23.0	139.5	55 19.2	75.9	39 38.4	114.8	56 28.8	64.9	9 14.1	141.7	3 0	
74.7	128.1	46 1.8	102.6	11 52.6	138.7	54 33.9	75.5	38 56.0	113.9	55 45.8	64.7	8 44.9	140.9	4	
33.8	127.4	45 16.2	101.8	11 21.6	138.0	53 48.9	75.2	38 13.2	113.0	55 3.7	64.6	8 15.3	140.2	8	
33.8	126.6	44 30.6	101.0	10 50.2	137.3	53 3.8	74.8	37 30.1	112.2	54 21.6	64.4	7 45.2	139.5	12	
33.8	125.8	43 44.6	100.2	10 18.4	136.5	52 18.8	74.4	36 46.8	111.3	53 39.5	64.3	7 14.8	138.8	16	
56.1	125.8	42 58.7	99.5	9 46.1	135.8	51 34.0	74.1	36 3.1	110.5	52 57.6	64.1	6 43.9	138.1	20	
30.9	125.0	42 12.8	98.7	9 13.3	135.1	50 49.2	73.7	35 19.4	109.7	52 15.7	63.9	6 12.5	137.4	24	
30.9	124.2	41 26.6	98.0	8 40.2	134.4	50 4.5	73.4	34 35.3	108.9	51 33.8	63.7	5 40.8	136.7	28	
30.9	123.4	40 40.4	97.3	8 6.6	133.6	49 19.8	73.0	33 51.1	108.1	50 52.1	63.5	5 8.7	136.0	32	
42.8	122.6	39 54.0	96.6	7 32.7	132.9	48 35.3	72.6	33 6.7	107.3	50 10.4	63.3	4 36.1	135.4	36	
21.3	121.8	39 7.8	95.9	6 58.4	132.3	47 50.9	72.3	32 22.1	106.5	49 28.7	63.1	4 3.1	134.7	40	
2.5	121.1	38 21.3	95.2	6 23.7	131.6	47 6.5	71.9	31 37.3	105.7	48 47.3	62.9	3 29.7	134.0	44	
2.2	120.3	37 34.9	94.5	5 48.7	130.9	46 22.2	71.5	30 52.0	104.8	48 5.8	62.8	2 56.0	133.4	48	
46.9	119.6	36 48.3	93.8	5 13.2	130.2	45 38.0	71.2	30 7.2	104.2	47 24.5	62.4	2 23.0	132.7	52	
1.3	118.8	36 1.9	93.2	4 37.4	129.5	44 54.0	70.8	29 21.9	103.5	46 43.1	62.2	1 47.6	132.1	56	
20.3	118.1	35 15.3	92.5	4 1.2	128.9	44 10.0	70.4	28 36.6	102.8	46 2.0	61.9	1 12.8	131.4	4 0	
30.0	117.4	34 28.7	91.9	3 24.8	128.2	43 26.1	70.0	27 51.0	102.1	45 30.9	61.7	0 37.0	130.8	8	
5.8	116.6	33 42.1	91.2	2 48.0	127.5	42 41.3	69.7	27 5.3	101.4	44 39.9	61.5	0 3.0	130.2	12	
25.7	115.9	32 55.5	90.6	2 10.9	126.9	41 56.0	69.3	26 19.6	100.7	43 59.1	61.1			16	
33.6	115.2	32 8.8	89.9	1 33.1	126.2	41 15.1	68.9	25 33.7	100.0	43 18.3	60.9			20	
25.9	114.5	31 22.2	89.3	0 55.7	125.6	40 31.6	68.5	24 47.7	99.3	42 37.6	60.6			24	
8.8	113.8	30 35.6	88.7	0 17.8	125.0	39 48.3	68.1	24 1.7	98.6	41 56.9	60.3			28	
25.9	113.2	29 48.9	88.1			39 5.1	67.7	23 15.5	97.9	41 16.5	60.0			32	
42.9	112.5	29 2.3	87.5			38 22.0	67.3	22 29.4	97.2	40 36.2	59.7			36	
59.7	111.8	28 15.8	86.9			37 39.0	67.0	21 43.0	96.6	39 56.0	59.4			40	
26.4	111.1	27 29.3	86.3			36 56.3	66.6	20 56.6	95.9	39 15.8	59.1			44	
32.8	110.4	26 42.8	85.7			36 13.5	66.2	20 10.2	95.2	38 35.9	58.8			48	
50.0	109.8	25 56.3	85.1			35 30.9	65.8	19 23.8	94.6	37 50.1	58.5			52	
5.0	109.1	25 9.8	84.5			34 48.5	65.4	18 37.3	93.9	37 16.4	58.2			56	
59.7	108.5	24 23.4	83.9			34 6.2	65.0	17 50.8	93.3	36 36.8	57.9			60	
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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

CONVENIENT METHOD OF HANDLING STEAMING DATA

By LIEUTENANT JULES JAMES, U. S. Navy

To provide a ready means of obtaining steaming data in convenient form the curves below were prepared for one of the ships. With this set of curves and a report of coal on board, the commanding officer will have, ready at hand, all the data necessary to solve the steaming problems which arise from time to time.

These curves were all made from data obtained from a performance sheet furnished by the Office of Gunnery Exercises and Engineering Performances. This performance sheet, illustrated in Fig. 1, was made from actual steaming data recorded during the years 1910 to 1917 and represents performance under all sorts of conditions of coal, boilers, bottoms, weather, etc. A similar sheet is furnished to all vessels of the navy.

The curve shown on this sheet (Fig. 1) was drawn by the author of this article, is the average of the data plotted, and may be assumed to be the probable performance of the vessel under average conditions.

Curves *A*, *B* and *C* were plotted from data taken from the curve (Fig. 1) and converted into the proper co-ordinates, as shown by columns 1 to 7 in Table 1 on page 588.

Curve *A* represents this curve plotted as the ordinary type of coal-consumption curve; that is, tons per day *vs.* knots per hour. (Col. 4 *vs.* col. 1.)

Curves *B*, *C* and *D* are the same curves expressed in different co-ordinates merely to facilitate their uses.

Curve *B* is a curve of miles per ton *vs.* knots per hour. (Col. 5 *vs.* col. 1.)

Curve *C* is a curve of steaming radius *vs.* knots per hour. (Col. 6 *vs.* col. 1.)

Curve *D* is a curve of R. P. M. *vs.* knots per hour. (Col. 8 *vs.* col. 1.) This curve was plotted from the R. P. M. card usually kept on the bridge.

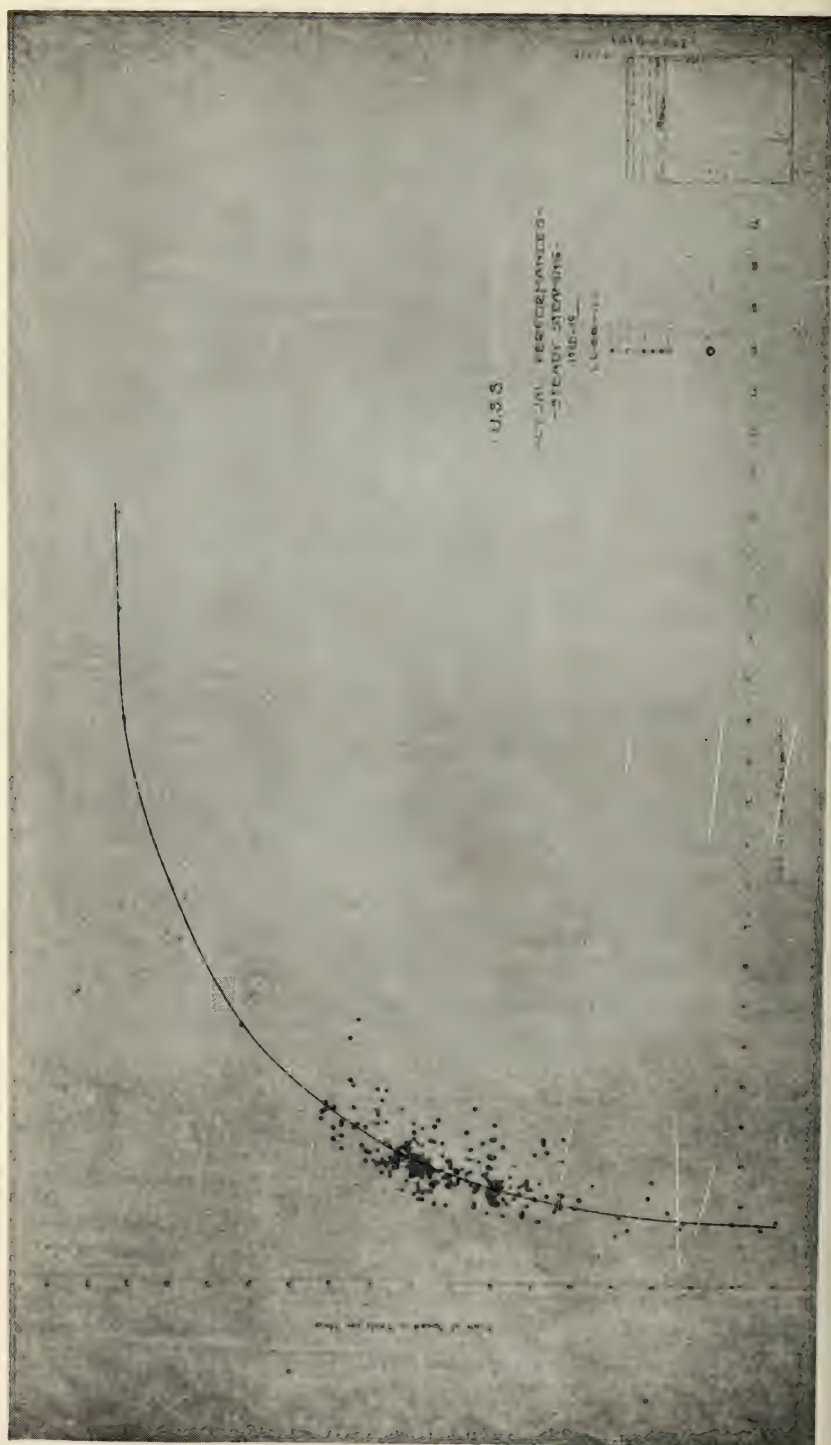


FIG. 1.

It is recommended that another curve C' , similar to C and just below it, be plotted in case certain bunkers are to be kept as reserve bunkers and not ordinarily used. (Col. 7 *vs.* col. 1.) The additional curve would be made out for a fuel capacity equal to the total minus the reserve. In this particular case the reserve is taken as 194 tons.

TABLE I

Knots per hour	Miles per day Col. 1x24	Tons per hour curve Fig. 1	Tons per day Col. 3x24	Miles per ton Col. 2 Col. 4	Cruising radius 1144 tons Col. 5x1144	Cruising radius 950 tons Col. 5x950
3	72	1.510	36.24	1.990	2277	1891
4	96	1.550	37.20	2.580	2952	2451
5	120	1.600	28.40	3.125	3575	2969
6	144	1.675	40.20	3.582	4098	3403
7	168	1.790	42.96	3.911	4474	3715
8	192	1.955	46.92	4.092	4681	3888
9	216	2.165	51.96	4.157	4756	3949
10	240	2.425	57.66	4.162	4761	3954
11	264	2.735	65.64	4.022	4601	3821
12	288	3.125	75.20	3.840	4393	3648
13	312	3.670	88.08	3.542	4052	3365
14	336	4.330	103.92	3.233	3698	3071
15	360	5.120	122.88	2.930	3352	2784
16	384	6.140	147.37	2.606	2981	2476
17	408	7.630	183.12	2.228	2549	2117
18	432	9.780	234.72	1.841	2106	1749
19	456	12.650	303.60	1.502	1719	1427

It is evident that these curves are equally applicable to coal- and oil-burning vessels.

To illustrate the uses of the sheet, suppose the ship had to make a voyage of 1650 miles on 500 tons of coal. This is 3.3 miles per ton that must be made. A ruler laid across the sheet at 3.3 on the B scale cuts the B curve at 5.3 knots and at 13.9 knots on the E scale at the bottom, so any speed between these two can be used. These speeds give 32 and 84 R. P. M. respectively on curve D .

Or let us suppose the ship, with full bunkers, were to receive orders to leave Norfolk for a voyage of 2000 miles. The commanding officer wishes to make all speed possible, but not to draw on his reserve coal. Therefore he uses curve C' and entering from 2000 on the C scale a horizontal cuts the curve at 17.5 knots which is the maximum speed he can use. The R. P. M. curve shows that this speed is made at 107 R. P. M.

Let us suppose that outside he encounters a storm with consequent delay, and after a day's steaming finds that, having had to ride out the storm, he has used 150 tons of coal and still has 1800 miles to go. He now has available 800 tons to go 1800 miles; therefore, he must make $2\frac{1}{4}$ miles per ton of coal. Entering from $2\frac{1}{4}$ on the *B* scale a horizontal cuts the *B* curve at 16.9 knots per hour: so he is assured that if he slows to 16.9 knots he will make port under present conditions and with his reserve coal intact. Should he encounter another delay, he can again go to the curve and find out his new highest speed to enable him to reach port with his reserve coal. On the other hand, should he be set along his course he can go to the curve and in the same manner find out how much he can increase his speed.

If for any reason he wishes to steam at slow speeds he can continue his horizontal over to the other branch of the curve and find the lowest speed he can maintain to reach port.

If he wishes to reach port with the least expenditure of coal he simply has to look at *B* curve and see that between 9 and 10 knots he can make most miles per ton of coal expended. This place on the curve is clearly the economical speed.

Suppose the ship is under orders to proceed to sea 100 miles, circle for 48 hours at 18 knots and return. He must steam 864 miles in circling. Entering from 19 knots on the *E* scale a vertical line cuts curve *B* at 1.85 miles per ton. Therefore, he will use $864 \div 1.85 = 467$ tons in circling. Suppose he has 550 tons on hand. He will have 83 tons available for the voyage out and back. Therefore, he must make 2.41 miles per ton going out and returning. Entering from 2.41 on the *B* scale a horizontal cuts the *B* curve at 16.5 knots which is the maximum speed he must maintain going out and returning.

The uses of the R. P. M. curve and coal-consumption curve proper are too familiar to require demonstration.

This curve sheet contains all the steaming data required for the solution of all problems in simple steaming, and can conveniently be put on a single sheet of 8" x 10" plotting paper convenient for a note-book, or for pasting on a board to be kept in the cabin. It is believed that this method of handling steaming data will be found very convenient and that solutions can be made more quickly, and with less liability to error than when using the usual method of referring to tables of data which have to be interpolated, and

figuring in hours and consumption per hour. Using the curve one actually sees the expected performance and gets better information than when figuring to obtain a single point.

ADDENDUM

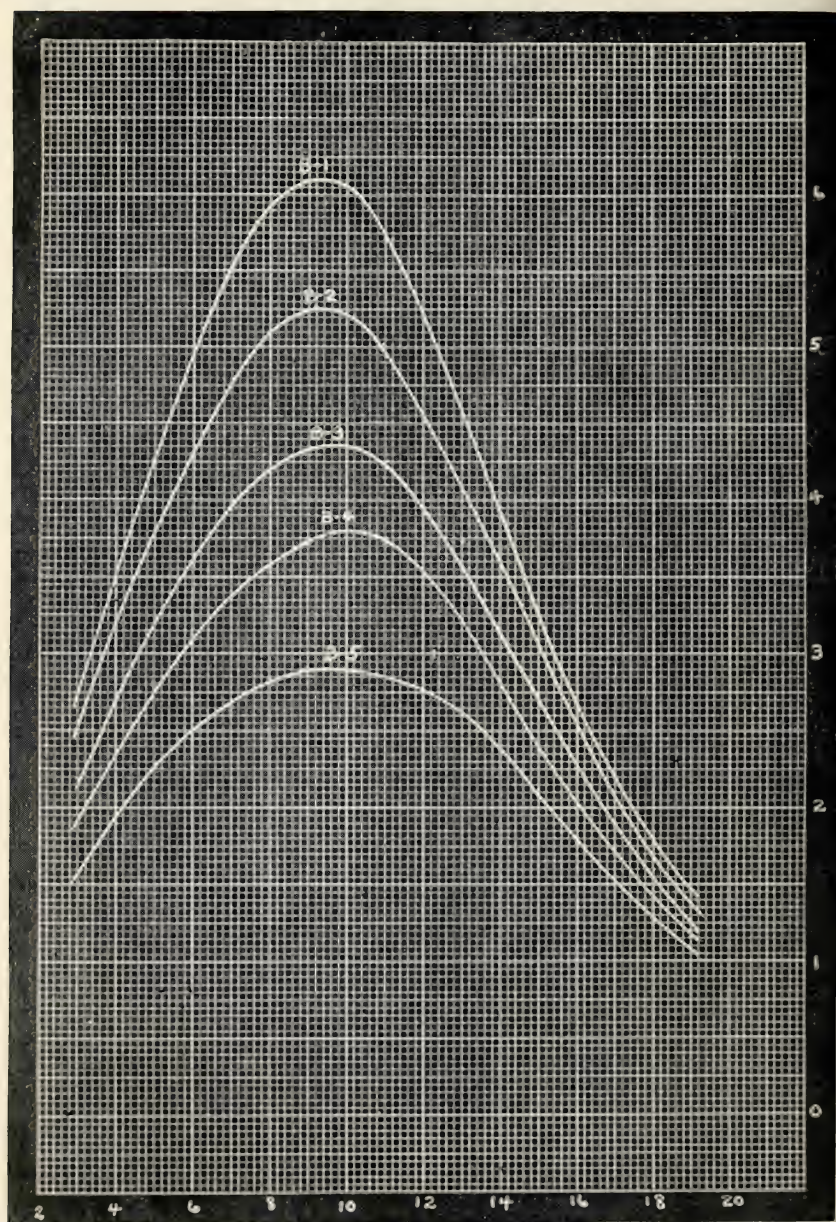
At the suggestion of Commander Kalbfus of the Office of Gunnery Exercises and Engineering Performances, the following is added to the article as originally written :

Instead of drawing the single average curve, five curves may be drawn on the performance sheet. These are illustrated by the five light curves in Fig. 3. The central one of these curves (*A-3*) is drawn as the average performance. Two curves are drawn on each side of this curve, *A-1* being the best performance, and the one used by the Department as the standard, while *A-5* is the worst performance curve and is aptly called the "danger curve." The other two are drawn about midway between the middle and the outer curves. The average curve is of course drawn through the centers of the greatest number of spots.

From each one of these five curves a separate set of curves of cruising radius and miles per ton is drawn, as illustrated for a single curve in the original article; and to avoid complication the curves are put on three separate sheets. Fig. 4 represents the five curves of "miles per ton" corresponding to the five performance curves, *A-1*, *A-2*, etc. Fig. 5 represents the five corresponding curves of "cruising radius" using 1144 tons of coal, and Fig. 6 represents the five corresponding curves of "cruising radius" using 950 tons of coal.

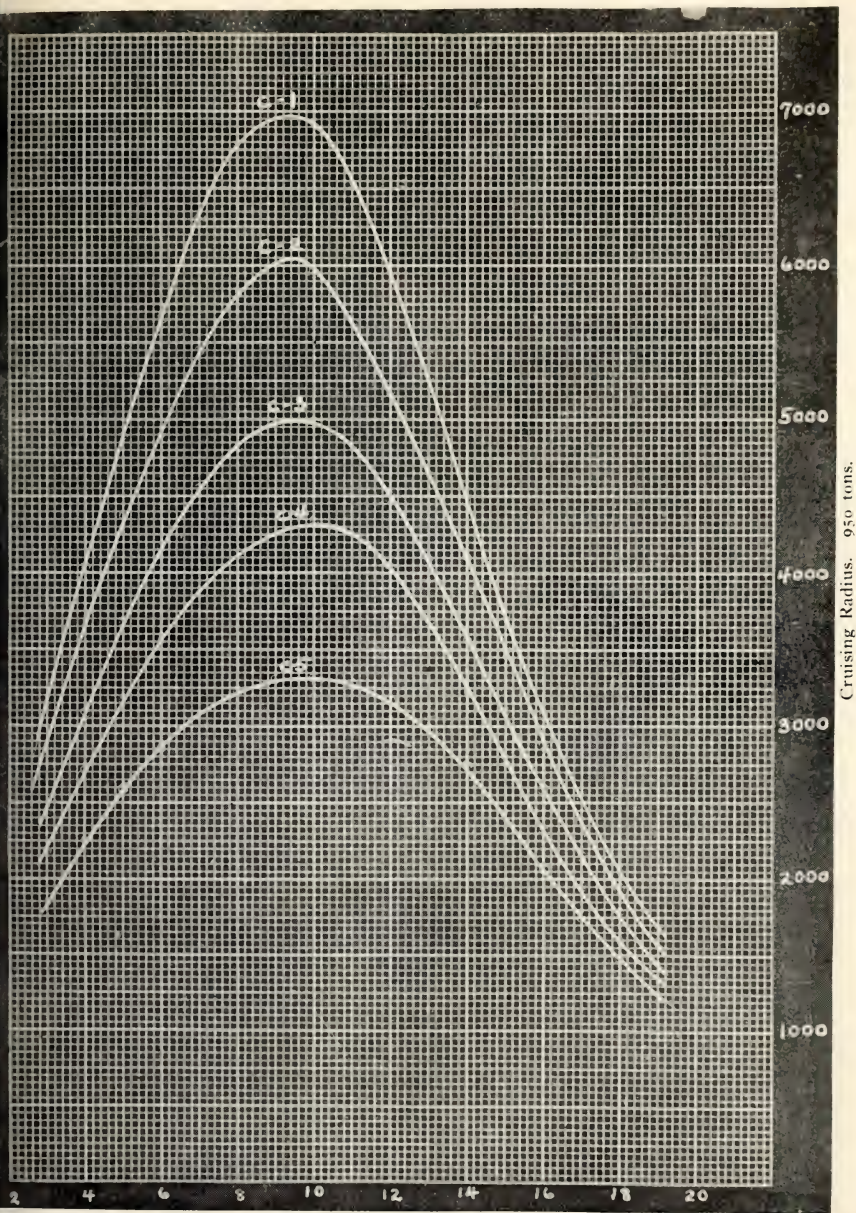
Having the five sets of curves the commanding officer, instead of depending on the average curves can select the curves which coincide with present conditions of steaming, as found by the latest performance of his vessel.

The uses of the curves are exactly the same as illustrated in the original article, except that here the commanding officer selects a set of curves which more closely agrees with his present steaming capacity as influenced by bottom, coal, draft, etc., or, on applying his data for the first day's steaming, selects for use the curves on which these data fall, or interpolate between the two sets of curves between which they fall. The five sets of curves will of course cover all conditions.



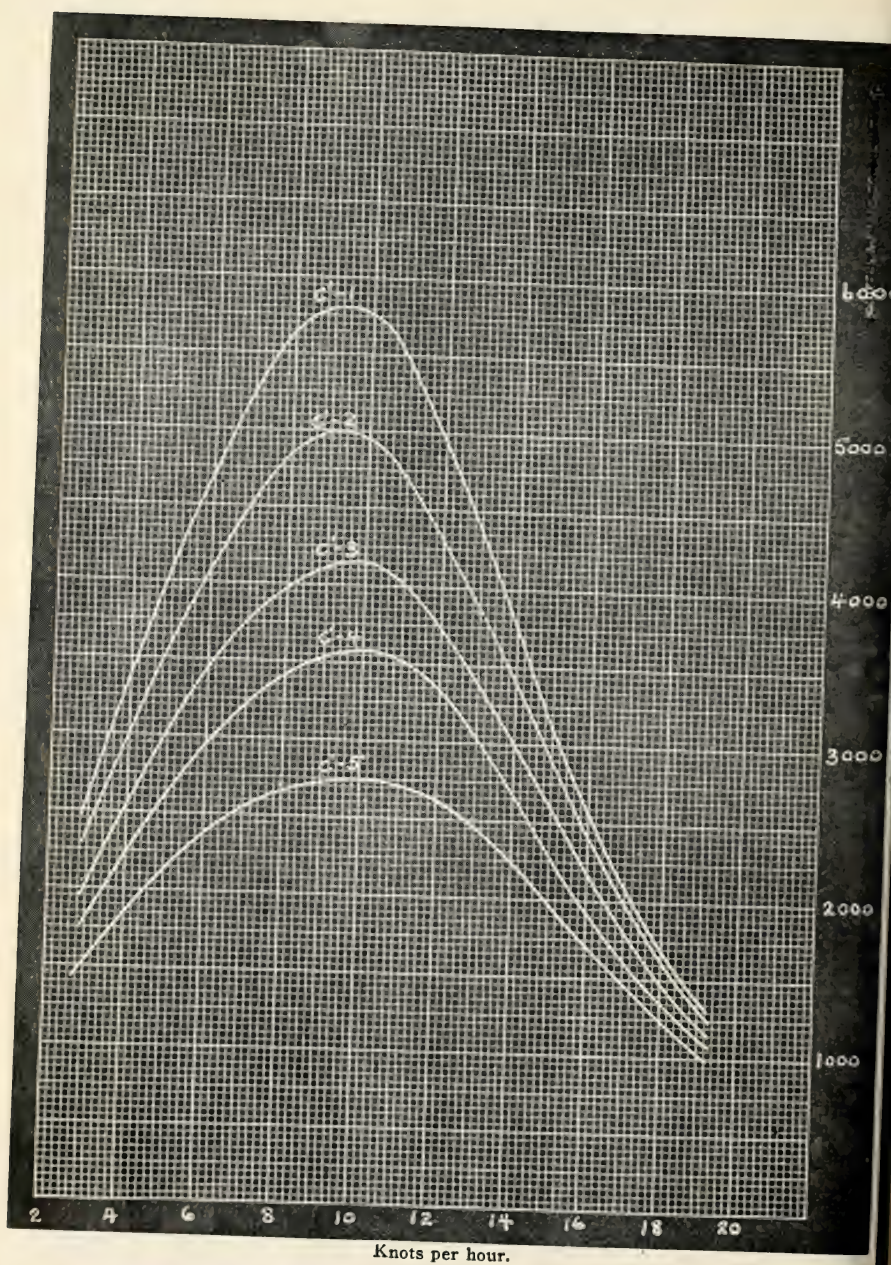
Knots per hour.

FIG. 4.



Knots per hour.

FIG. 5.



Knots per hour.

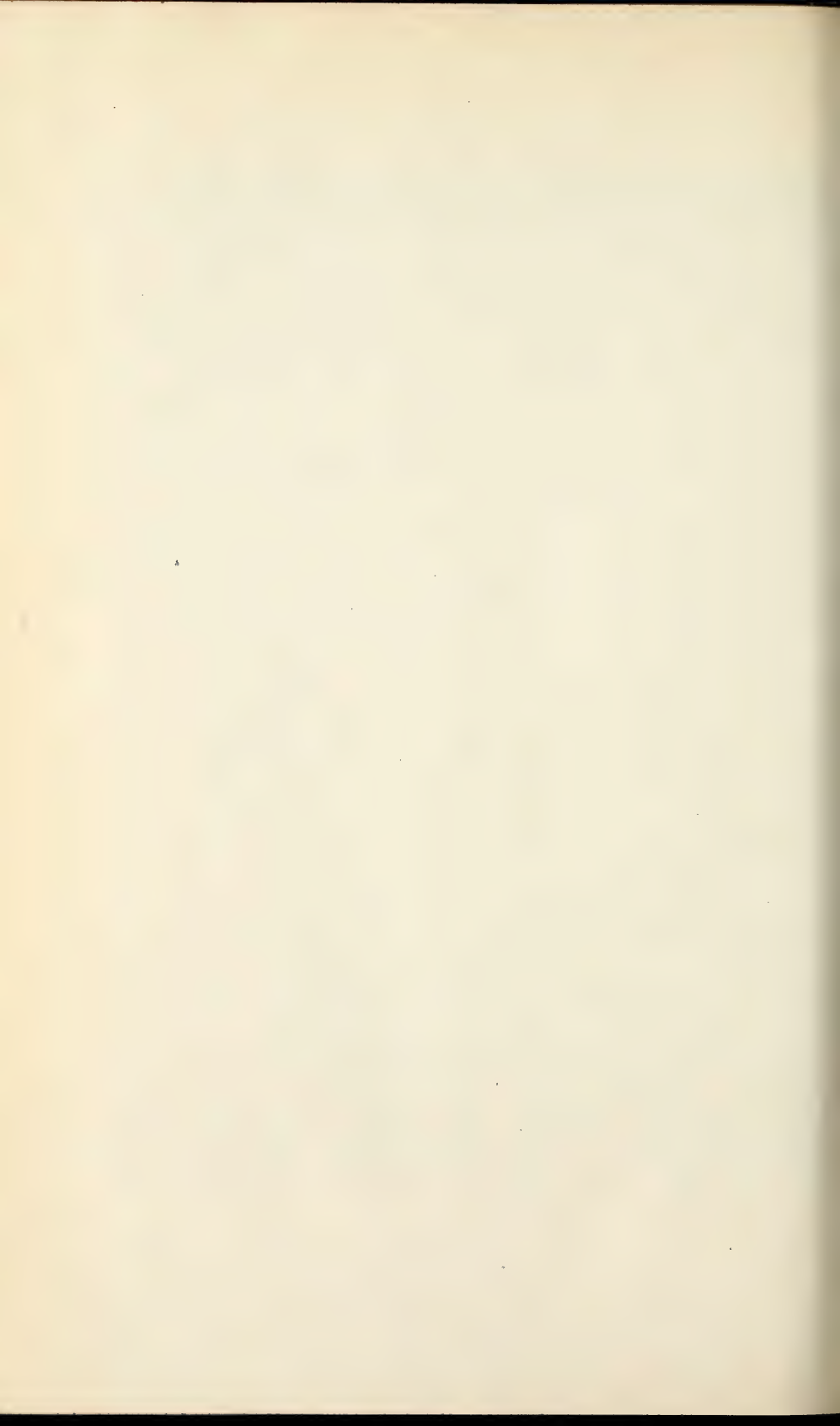
FIG. 6.

To illustrate: In the first problem, where the vessel has to make a voyage of 1650 miles on 500 tons of coal (or 3.3 miles per ton of coal), the commanding officer would be justified in selecting the curve of "miles per ton" corresponding to the latest performance of the vessel. Suppose during the last trip the vessel, steaming at 13 knots, made 4.1 miles per ton. The commanding officer, before sailing, would enter the "miles per ton" curve, Fig. 4, from 13 knots on the "knots per hour" scale, a vertical from which intersects a horizontal from 4.1 on the "miles per ton" scale on curve *B-2*. Therefore curve *B-2* would be used. So entering from 3.3 on the "miles per ton" scale a horizontal cuts curve *B-2* at 14.6 knots and at 4.2 knots, between which speeds he can make the trip without using more than 500 tons of coal.

Suppose he chooses 14 knots and after a day's steaming finds that he has made 3.5 miles per ton. Entering from 14 on the "knots per hour" scale, a vertical intersects a horizontal from 3.5 on the "miles per ton" scale just below the curve *B-2*, so he can predict his future steaming performance as lying along an imaginary curve just below *B-2*.

In the second illustration he has a voyage of 2000 miles to make without drawing on his reserve. Suppose that, as before, his most recent performance falls on curve *B-2*. He would in this case use curve *C-2* which corresponds to *B-2*, *C'-2*, etc. Entering from 2000 on the "cruising radius" scale a horizontal cuts curve *C'-2* at 17 knots which is the maximum speed he may use. After the first day's steaming he can recalculate, and should his data fall off curve *C'-2* he can use the curve on which it falls or interpolate between the two curves between which it falls. The other illustrations, and various problems that arise, can be handled in the same manner.

The original curve sheet was made for practical use aboard ship and with no idea of publication. It was found to be very desirable for use by the commanding officer, and the original description was accordingly written. Commander Kalbfus in reviewing the article suggested that it be expanded along the lines indicated. It is believed that a use of the curves in either the simple form of the average performance, or as expanded into five separate standards, will be found very useful and convenient.



U. S. NAVAL INSTITUTE

SECRETARY'S NOTES

The Board of Control announces the following

Prize Essays awards in the Prize Essay Contest 1918:

1918

Prize Essay awarded to Lieutenant Holloway

H. Frost, U. S. Navy. Subject, "Letters on

Naval Tactics." Motto: "Indoctrination makes effective coordination possible. Effective coordination makes concentration possible. Effective concentration, combined with the spirit of the offensive, makes victory probable."

VOGELGESANG.

First Honorable Mention awarded to Commander H. O. Rittenhouse, U. S. Navy, Retired. Subject, "The Preparedness of the Future." Motto: "When a strong man armed keepeth his palace, his goods are in peace."

Second Honorable Mention awarded to Rear Admiral Bradley A. Fiske, U. S. Navy. Subject, "Naval Strategy." Motto: "First estimate the situation: then decide: then act."

The Prize Essay will be published in the April number of the PROCEEDINGS, if returned in time by the censor.

It is requested that all members take a more active interest in the writing and submitting of articles for publication in the PROCEEDINGS in order that the monthly publication may be continued and the usual standard maintained.

Dues It is requested that members who have not paid their 1918 dues of \$2.50, do so at their earliest convenience.

Address of Members Because of the fact that many copies of the PROCEEDINGS are being returned by the Postal Authorities, *all members are urged to keep the Secretary and Treasurer informed of the address to which PROCEEDINGS are to be sent, and thus insure their receipt.*

This precaution is now of particular importance as notices of changes of stations are not now available for the use of the Institute's staff.

Members and subscribers are urged to notify the Secretary and Treasurer promptly of the non-receipt of PROCEEDINGS, in order that tracers may be started. The issue is completed by the 10th of each month.

Member-ship Since December, 175 regular members have joined the Institute.

Deaths:

Captain Daniel Delehanty, U. S. N.

Captain R. K. Crank, U. S. N.

Lieutenant (J. G.) S. F. Kalk, U. S. N.

Ensign E. D. Peck, U. S. N.

Resignations: One.

Book Announcements Attention is invited to the List of Book Publications for a complete catalogue of books revised and republished by the INSTITUTE.

The Landing Force Manual, U. S. Navy, 1917, is being compiled by a board of officers and will be ready for distribution shortly after the compilation has been completed, probably April 15, 1918.

The Manual of Wireless Telegraphy has been revised and is ready for distribution under the title "Robison's Manual of Radio Telegraphy and Telephony."

Navigation and Compass Deviations, by Lieut. Commander W. C. Muir has been revised and is ready for distribution.

Discount on Books The five per cent additional discount allowed to purchasers of books whose accounts during a calendar month amounted to a hundred dollars or over has been discontinued.

Book Department The Institute Book Department will supply any obtainable book, of any kind, at retail price, postage prepaid. The trouble saved the purchaser through having one source of supply for all books, should be considered. The cost will not be greater and sometimes less than when obtained from dealers.

Suggestions Comment and suggestions relative to the make-up of the PROCEEDINGS are invited from all members interested in the welfare of the Institute. It is believed that the scope of usefulness of the PROCEEDINGS to members can be increased and all members are invited to assist in this work. Should any topic, on which you think an article could well be written, occur to you, send it to the Secretary and Treasurer, together with such explanation or comment as may appear desirable in order that the intent of the suggestion may be clearly understood.

Reprints of Articles The attention of authors of articles is called to the fact that the cost to them of reprints other than the usual number furnished, can be greatly reduced if the reprints are struck off while the article is in press. They are requested to notify the Secretary and Treasurer of the number of reprints desired when the article is submitted. Twenty copies of reprints are furnished authors free of charge.

Illustrations Authors of articles submitted are urged to furnish with their manuscript any illustrations they may have in their possession for such articles. The Institute will gladly co-operate in obtaining such illustrations as may be suggested by authors.

Original photographs of objects and events which may be of interest to our readers are also desired, and members who have opportunities to obtain such photographs are requested to secure them for the Institute.

Notice Whole Nos. 145, 146, 147, 149, 155 and 166 of the PROCEEDINGS (March, 1913, June, 1913, September, 1913, January-February, 1914, January-February, 1915, and November-December, 1916) are exhausted; there are so many calls for single copies of these numbers that the Institute offers to pay for copies thereof returned in good condition at the rate of 25 cents per copy.

ANNAPOLIS, MD., February 22, 1918.

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ADMIRAL BENSON CHATS WITH COMMANDER-IN-CHIEF OF BRITISH GRAND FLEET ON FLAGSHIP.

Photo from Underwood & Underwood, N. Y.

PROFESSIONAL NOTES

PREPARED BY

LIEUTENANT W. B. JÜPP, U. S. Navy

GENERAL ARRANGEMENT

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BRAZIL

U. S. NAVY TEACHERS FOR BRAZILIAN NAVY.—Secretary Daniels announces that a commission of American naval officers will go to Brazil as instructors in the Brazilian school for naval cadets.

In sending these officers the United States is carrying out a recent promise to Brazil to assist in that country's war preparations.—*Official Bulletin*, 28/1.

BRAZIL WOULD AID AIR AND SEA FIGHT.—Commenting on notes exchanged between the Brazilian Foreign Minister, Nilo Pecanha, and the British Minister, Arthur Peel, on the subject of Brazil's naval contribution to the war, the *Jornal do Commercio* lays stress on the firm determination of Brazil to act, on the one hand, by means of aviators sent to England, and, on the other, by cruiser and destroyer squadrons.—*N. Y. Herald*, 31/1.

BRAZIL BUILDING AN ARMY.—Plans for the mobilization of an army of defence to be composed of several hundred thousand men are being put into execution with almost feverish haste, but no announcement has been made that Brazil will send troops to Europe. It is generally believed that this fighting force is to remain in Brazil.

When Brazil declared a state of war to exist with the German Empire the Brazilian Army was composed of 18,000 men, with officers enough for 30,000. Plans were made immediately for increasing the standing army to 35,000 men by January 1, with the possibility of further increasing it to 100,000 within the year.

The mobilization plan provides for three lines of defence, the first eventually to comprise 100,000 between 17 and 30. To assure this number, it is said in official circles that conscription will take the place of the voluntary system of enlistment, which has been in effect until now.

The second line is to consist of an army of 500,000 men between 30 and 37, with detachments in every city and town in the republic. These men are to be mobilized on a war footing, ready for service at short notice, though it is not believed that they will be kept under arms, the plan apparently being to organize them as a home guard and permit them to attend to their business affairs, devoting stated periods of time to drill.

In addition to these two armies there is to be a reserve army, to be known as the national guard, comprising men between 37 and 44. The officers of this force are to be chosen from government administrative officers, commercial men, and employers of industry.—*N. Y. Times*, 21/1.

FRANCE

FRANCE TO TAKE MERCHANT SHIPS.—*Requisition of Entire Fleet is Decried as Effective on March 10.*—A decree published in the *Journal Officiel* provides for the requisitioning of the entire merchant marine of France on March 10.

Government commissioners will confer with the shipowners as to the conditions under which the government will take over the vessels.—*Washington Post*, 17/2.

GERMANY

SUBMARINE BUILDING.—To arrive at a fair or accurate estimate of the rate at which Germany can build submarines in the future is difficult. Assuming, however, that all yards in the country were utilized exclusively for this kind of work and that no mercantile shipbuilding or repairs to the battle fleet were undertaken, which, of course, is far from being the case, the probability is that not more than 100 submarines could be completed every six months.

Information at hand would indicate that the actual recent output has been approximately 10 per month, of which the great majority are in the neighborhood of 800 tons to 1000 tons displacement. Several groups of about 1500 tons have also been commissioned and quite recently the construction of a flotilla of eight so-called submarine cruisers of 2800 tons displacement has been undertaken, of which three or more are reported completed and the remainder will be ready for service by next February. These vessels will mount two 6-inch guns, besides two guns of lighter caliber, and embody the innovation of an armored conning-tower. This is more or less essential where the conning-tower constitutes the central control station of the vessel and at the same time is the most vulnerable part. It is only feasible, however, on vessels of great size, because of submerged stability considerations.—*Navy and Merchant Marine*, January.

GERMANS TO BUILD 5000 PLANES.—Germany will have on the front some 5000 modern type war aeroplanes, with sufficient machines being constructed monthly by the various manufacturers to nearly replace those lost in battle and by accidents.

By offering special inducements to men entering the aviation service, great numbers of volunteer pilots, observers and bombardiers have been secured, and are now under training in adequately equipped training camps.

It is realized by the allied aviators that 1918 will see stiffer fighting in the air than was deemed possible even a few months ago. The aerial forces of the United States cannot be whipped into shape too rapidly if they are to participate in the coming decisive struggles for the mastery of the skies.

The number of Prussian, Saxon, Bavarian and Wurtemberg escadrilles at present on a war footing and at the front is 270, classed as follows:

Bombardment escadrilles (Kampfstaffeln), 23; chasing escadrilles (Jagd-staffeln), 40; protection escadrilles (Schutzstaffeln), 30; campaign escadrilles (Fliegerabteilungen), 80; artillery observation escadrilles (Fliegerabteilungen A), 100.

The total number of aeroplanes represented by these 270 escadrilles is about 2500. The bombarding and chasing escadrilles are being increased

in number and strength rapidly, as the German aviation authorities consider them the most effective instruments of aerial warfare.

To the above formations must be added: The naval aviation groups, which include land escadrilles (Landfliegerabteilungen) and sea escadrilles, of an uncertain number; the fixed escadrilles (Kampfeinsatzstaffeln), perhaps 10 in number, and some 12 depot escadrilles (Fliegerersatzabteilungen), which serve for the training of pilots and as a reserve for the escadrilles at the front.

The German aviation parks comprise:

With each army an army aviation park, including a depot for materials and machines; workshops and repair rooms and a reserve of personnel for the different escadrilles. In addition there are a certain number of special and emergency parks.—*Evening Star*, 30/1.

TORPEDO SHORTAGE RESTRICTS U-BOATS.—Shortage of torpedoes is one of the most serious facts with which the directors of the German U-boat war are now faced. It is a well known and admitted fact that German factories are at present absolutely unable to turn out first-class torpedoes in anywhere near sufficient quantities for the needs of the submarines. In fact, the underwater craft are being turned out faster than the torpedoes, with the result that recourse has been had to various expedients to keep the submarines supplied with their chief weapon.

Germany's fleet of U-boats must carry thousands of torpedoes. Thousands more must always be ready in reserve. In fact, the reserve supply should be larger to-day than a year ago, to allow for the more frequent calls made on it. The augmented destroyer patrol is responsible for this. They have made the submarines use up more torpedoes and have caused them to return to their base more frequently for reloading.

Eight may be said to be the average number of torpedoes carried in one submarine. The number ranges from four to twelve, according to the type of submarine. The *U-53*, which raided shipping off the Atlantic Coast of the United States, carried 10. More recent types load as many as 12. Mine layers can accommodate two, four, or six, depending on their size.

In connection with this shortage is the fact that all U-boat commanders now are strictly "rationed" as far as their supply of torpedoes is concerned, and are not permitted to waste torpedoes on long "chance shots" except in circumstances which they must explain in detail as justifying the expenditure of the underwater missiles.

Recently the German factories have been turning out a smaller torpedo which is less accurately tested but which may be used with a fair degree of certainty at close range. Of late very few German torpedoes have proved effective unless at fairly close range, and it has become unusual for a U-boat commander to make any attempt at a merchant ship unless he can get within 500 to 600 yards.

The Germans are now using two types of torpedoes. They may be described as short-charge and full-charge torpedoes. The short-charge is the one used mostly against merchant shipping and is fired at 500 to 600 yards. The full-charge, which has probably twice the destructive force and is better made, is reserved for men-of-war. It is fired at a great distance and is used less frequently than the cheaper torpedo.

But the comparative immunity of the American destroyers from torpedo attack—despite the loss of the *Jacob Jones* and the slight disablement of the *Cassin*—is noteworthy in this connection. The Germans hate the American destroyers as one of their worst enemies in their most fertile field of war action, and there is scarcely an American destroyer but has had one or more German torpedoes fired at her, yet only twice have the torpedoes found their mark.

The Americans and the British, with whom they are cooperating so successfully in this game of hunting "tin fish," attribute their immunity to the mobility of the destroyer. The alertness of the American naval men, coupled with their well-known keenness for offensive tactics against the submarine, have been responsible for their slight losses. Sharp lookouts

and skillful maneuvering enable them to cheat the Germans so often.—*N. Y. Herald*, 3/2.

EXPLOSION AT MUNITION FACTORIES.—Reports of explosions in Germany are becoming increasingly numerous, notwithstanding all the efforts of the German authorities to suppress them. A Karlsruhe telegram to the *Frankfurter Zeitung* states that a few days ago an explosion occurred at certain munition factories, presumably caused through improper manipulation of the ammunition. A fire followed the explosion, and three persons were killed and five injured. The damage, says the telegram, was relatively slight. Experience shows that these notices are never inserted in the German press unless absolutely necessary in order to reassure the public. Slight explosions are left unrecorded.

The Mannheim *Volksstimme* reported a serious explosion in munition factories at Kirchbaum, near Forbach, followed by an extensive fire, and the death or injury of many people. Apparently this explosion and fire are identical with those reported from Karlsruhe as very slight.

These repeated explosions are causing considerable anxiety in military quarters, not only because of the interference with the supply of munitions thereby occasioned, but also because of the spirit of unrest in the districts where they occur. This unrest has been acute since the advent of the frost, with the attendant suffering and the paralysis of potato transport.

The air raid reprisals undertaken by the Allies are, I have good reason to know, having a most salutary effect in awakening the population to a sense of the consequences produced by the Germans' ruthless air raid policy. Only by this means can the German home population be brought to realize their rulers' mistakes. Every Entente air raid is a most valuable educational influence in this direction. Great nervousness is felt throughout Germany, especially in the more exposed parts, by the intention of the Americans to invade Germany by air. This subject is universally discussed, though efforts are being made to calm the uneasiness by declarations about American bluff.—*London Times*, 31/12.

GREAT BRITAIN

THE FIRST SEA LORD.—By Arthur Pollen.—When I returned to England at the end of last week, after having spent nearly six months in the United States, I learned that Admiral Sir John Jellicoe had left the Admiralty to receive a peerage, and that Sir Rosslyn Wemyss had been appointed First Sea Lord. These events constitute what the *Daily Telegraph* quite accurately described as a "sensational" announcement. But judging from such public comments as I have had the opportunity of perusing, a great variety of sensations seems to have been excited. A good many people are plainly at a loss to understand the significance of what has occurred.

Sir Rosslyn Wemyss, save for his appointment as Second Sea Lord six months ago, and his more recent promotion to acting as Sir John Jellicoe's deputy, appears to be almost unknown to the press or to the general public. This may account for a certain lack of enthusiasm in the reception of the news of his promotion. Similarly the causes which made a drastic change in the higher command necessary, seem also to have been very little understood. One paper of very wide circulation, I noted, published a portrait of the outgoing First Sea Lord, and printed underneath it and in italics a statement to the effect that this particular journal had "never joined in the anti-Jellicoe campaign." When people see no reason why a change should be made, and then hear that an officer entirely unknown to them has been entrusted with the most difficult and the most arduous post in the anti-German Alliance, they are not unnaturally filled with misgivings and suspect that the late holder of the post is the victim either of some personal intrigue or of a cowardly submission to press clamor, and so look upon his successor as a *pis-aller*—a choice where there is no choice. The facts of the position are diametrically opposite to what such people suppose.

My readers may remember that some time before Mr. Balfour reconstituted his board, about 13 months ago, I pointed out in these columns that such a reconstitution was necessary, that the task of selection was extremely difficult, and that it was exceedingly unlikely, so obscure were the indications of competence in this grave matter—that Mr. Balfour could rest satisfied with his first, or even with second choice of advisers. I said this because the first choice was already known to him. To those who shared my doubts of a year ago, and have noted what has occurred between their expression and the present date, will have been more surprised that the second choice has been so long a-coming than that it has at last been made. It is unnecessary then to explain to them, as it would be ungracious now to explain to others, precisely why the first of the events of last week was inevitable. It is unfortunate that these transitions cannot occur without inflicting pain. The British public is extraordinarily loyal to its favorites, and particularly to its naval favorites. A large section of the public, which for years before the war had taken real trouble to study naval affairs, was led to believe that the greatness of the British Navy derived solely from the seamanship and statesmanship of Sir John Fisher, and depended on the leadership of his chief pupil and successor. It was shocked when events at Gallipoli led to Lord Fisher's retirement. It is shocked now when the gallant and popular officer, who had the full confidence of the nation in his command of the grand fleet, has to make way for another. This mental distress is deeply to be regretted, but it cannot be avoided. Old estimates of personal worth and ability formed in times of peace are constantly upset by the rude realities of war, without those who have formed those estimates being able to realize exactly how the upset has occurred. For the moment it is best to leave this mystery unexplained. It is more to the purpose to set out why the "second choice" is a sound choice. It may be some consolation to such people to know that the officer who is now First Sea Lord is where he is because it is war, and nothing else, that has shown him to be what he is.

If, therefore, I am asked what the recent changes in the Board of Admiralty signify, my simplest answer is, to say that at last we have an officer appointed First Sea Lord, not because of his seniority in the navy list, nor because he is blessed—or cursed—with a newspaper or popular reputation, but simply on merit shown in war. I was in Washington when Sir Edward Carson joined the War Cabinet, and an enterprising interviewer asked me why the Premier had put an ex-railway manager, presumably ignorant of the sea affair, at the head of the British Navy. I replied that he had done so for the almost incredible, but nevertheless valid reason, that Sir Eric Geddes had shown himself to be the right man for the place. Just as Mr. Lloyd George passed over all the popular politicians and chose the ablest man he knew for the most difficult position that a civilian can fill, so now Sir Eric himself has passed over all the advertised admirals and appointed the proved man for the most difficult post a naval officer can fill. It is natural to ask in what the proof consists.

In the early stages of the war the evidence of Sir Rosslyn Wemyss' merits must either have been slender or was unperceived, for when Sir Sackville Carden fell ill, a day or two before the last and most disastrous attempt to force the Dardanelles, Rear Admiral de Robeck was appointed to succeed him, and two officers senior to him were passed over by this preference. Sir Rosslyn Wemyss was one of these. It is not an agreeable position for a rear admiral to find himself suddenly and unexpectedly subordinate to his junior. But it is in the day's work to accept these things with simple loyalty, and it would be no compliment to the present First Sea Lord to select that for congratulation which every naval officer must look upon as the most obvious and elementary of his duties. The fact is recalled to show that in March, 1915, Whitehall did not yet know their man, and likely enough because he had not yet been given his opportunity. But it was not long in coming now. It is known that on him devolved the chief share in the naval part of the two evacuations of the peninsular, and that

the naval part was the chief part. But his work at the bases previous to this and his subsequent work when he succeeded Sir John de Robeck in command of the Mediterranean, seem hardly to be known at all.

The abandonment of the Gallipoli adventure coincided, it may be remembered, with the beginning of the enemy's submarine activities on a large scale in the middle seas. The Mediterranean command was not limited to the Mediterranean, and it included the care of at least three lines of communications to different large army bases, and necessarily involved the closest co-operation with the French and Italian fleets. Few, if any, naval officers, therefore, have ever undertaken duties more difficult, more extensive and various, or more complicated than those which now fell upon the new C.-in-C. I see it has been stated, on the strength of his having commanded the vessel in which the King once visited his Eastern Dominions, that Sir Rosslyn Wemyss enjoys a reputation as a courtier. This is about as illuminating a remark as to say that because he wears a monocle he has a reputation as a dandy. But it is true that Admiral Wemyss is, in the best sense of that much hackneyed term, a man of the world. It was this fortunate circumstance combined with a perfect acquaintance with the French language that smoothed his diplomatic path with our gallant naval allies. He illustrated in short, but in an unexpected sense, the dictum of Nelson, that the best of all negotiators was a British admiral backed by a British fleet. The Paris Conference decided, I understand, and the decision was in every sense gratifying, that an Allied Naval Council was to be established. In acting with such a council Sir Rosslyn Wemyss has his Mediterranean experience to guide him. He has to welcome a new ally, the United States, as an addition to those with whom he has dealt before. It is surely a happy augury that these complex relations will be handled at the British end by one whose knowledge of the world, whose tact and diplomatic accomplishment are unquestionable.

However, the essence of the Chief Command to-day is to get, first, out of the British naval force and then out of our allies, the maximum dynamic effort against the enemy's effort to cut our sea communications. As most competent observers have long since realized, the defeat of the submarine is far less a matter either of new inventions or of mere multiplication of known weapons or weapon-bearing units than a matter of the best combination of forces already in existence. This combination can only result from a rightly organized staff. What ground is there for supposing that Sir Rosslyn Wemyss will do better than his predecessors in this matter? They are of the most solid possible description. They are, in point of fact, just these, that when faced with those extensive, varied, complicated and difficult tasks to which I have alluded above, Admiral Wemyss was able to deal with them, and deal with them successfully, precisely because, knowing exactly what he wished to do and being resolute to get it done, he also knew how to organize the men at his disposal, so that each separate task was clearly defined and plainly feasible. He profited, in other words, by the grinding experience of Gallipoli, and realized that only by a rightly constituted staff could the manifold work of war be properly done. The scale of this achievement was naturally enough known to few. But, by July of last year, the evidences of it were available at Whitehall, and Sir Eric Geddes had not long been there before he had appreciated their meaning. It will be remembered that it was almost his first act to bring Sir Rosslyn Wemyss into his councils. The change was announced in America in the second week in August. I may, perhaps, be pardoned for quoting from an interview with me in a Washington journal on the occasion.

"The really big stroke is the retirement of Sir Cecil Burney and his replacement by Rear Admiral Rosslyn Wemyss. I have not a British Navy list by me, but, at a rough guess, I should say there are probably 40 officers senior to Admiral Wemyss who have been passed over to permit this officer to take this position. Wemyss has long been regarded by the forward school as a 'white hope.' He was second in command during the Gallipoli

campaign, where his promptness, energy and fighting spirit showed him not only a real leader, but a man possessed of that cool, quick judgment which is of the essence of the matter in war.

"The cables say the new Second Sea Lord is to be relieved of certain departmental duties, but do not tell us what the new duties are to be But is it not difficult to guess the character of the change. The rearrangement of two months ago brought about an amalgamation between the War Staff and the Board of Admiralty. The First Sea Lord was still left as the chief administrative head of the whole active navy and of the staff as well. I expect what will happen is that the First Sea Lord's functions will now be cut in half, that he will remain the chief professional administrator and the Second Sea Lord will become the chief of the War Staff. It will represent the triumph of the younger school. When the great changes took place in May, those of us who had fought so hard for them for so long approved everything that had been done, but complained that the thing had stopped too soon. We also saw that the thing could not remain stopped where it was. It had to be pushed to its logical conclusion. . . . It looks as if Sir Eric Geddes had found an extremely ingenious and perfectly effective way out of the difficulty. If the appointment of Admiral Wemyss means what I hope it means, we may expect to see the vast potential power of the British Navy applied to winning the war in a fashion which has not yet been applied."

It looks as if I did not very greatly misjudge the situation in August. What would seem to have happened is something like this. Sir Rosslyn Wemyss was tried at the Admiralty in the task of which he had shown himself to be a master in the Mediterranean. It was a task that had not been successfully met elsewhere, because it had never been attempted elsewhere. If he made good with the same success at Whitehall there would be no need for a deputy First Sea Lord, but a clear case for making him First Sea Lord. In the event Admiral Wemyss did make good.

Significance of Sea Power.—Surely the New Year could hardly open under happier auspices. The developments of the last few months have changed the position on land to the enemy's advantage in a most disconcerting and discouraging way. But as no one knows better than the enemy himself, it is at sea, and not on land that the war will finally be decided. The factors, that is to say, on which victory depends, are still those that derive from sea power. How well the enemy understood this a year ago was proved by his being compelled to drive the United States into belligerency rather than forego his only possible stroke at the sea supplies that kept the military alliance against him in munitions and stores, and the civil populations, on whose well being and contentment all military force is founded, supplied with the necessities of living and prosperity. A year ago, when the enemy's efforts to make peace after his many defeats on the Somme had failed, when President Wilson's last effort at an amicable arrangement had shown all the world that no settlement by negotiations was possible, it became at once clear that a ruthless submarine attack on our supply ships would immediately be made. Those who remembered the terms of the German surrender to America of the previous May expected nothing else. For, with curious and quite unnecessary candor, Berlin, for once, instead of making a promise and breaking it, entered into an undertaking that was purely provisional and warned the world that the objectionable sinkings would be resumed the moment it suited Germany's convenience or necessity. In other words, from the day when Von Tirpitz first threatened the world with the submarine, in December, 1914, until she drove America into war in February, 1917, Germany was never under the faintest illusion about the sea war being the real war.

It is a vital matter that civilians in all countries should bear this fundamental truth in mind, especially at the moment when the disappearance of Russia has altered the whole balance of power on land. For the disappearance of Russia and the change in the military situation that results, do not in the least degree affect the validity of the axiom on which our

enemy has acted consistently and from the first. For the military change amounts only to this, that until the American army redresses the balance on land, the allied forces are possibly insufficient to obtain a definite military victory. But, meanwhile, the enemy forces are still less able to obtain a decision in their favor. The change in balance, then, restores a situation gravely weighted against the Central Powers to equality only. And it is, at best, temporary.

The problem of the day, then, is civil endurance; how shall we hold out till the enemy force is spent? It is largely a matter of confidence—of the certainty of ultimate and complete success. This confidence—if I am right in saying that ultimate success turns on the sea war—should now be better founded than it has ever been, for the reason that never before have we had a better assurance that a sea power would be rightly used. The reform of the Admiralty, initiated by the criticisms of last April and May, begun by Mr. Lloyd George in the end of the latter month, and now completed by Sir Eric Geddes, should form the turning point in the war.—*Land & Water*, 3/1.

JAPAN

JAPAN RESPONSIBLE FOR KEEPING PEACE IN EAST.—“Japan holds herself responsible for the maintenance of peace in this part of the world, and consequently in the event of that peace being endangered to the inevitable detriment of our interests, the government of Japan will not hesitate a moment to take the proper measures.”

Thus Count Terauchi, the Japanese premier, spoke at the opening of the diet in referring to the internal disorders in Russia spreading to the Russian possessions in eastern Asia. The premier declared that the situation in Russia was causing him the greatest measure of anxiety. “As the true friend of Russia,” he said, “Japan earnestly hopes that country may successfully settle its difficulties without much further loss of time and establish a stable government.”

Count Terauchi said also that Japan joined unreservedly with the allied powers in the determination not to sheathe the sword until an honorable peace is secured.—*N. Y. Herald*, 24/1.

SPAIN

STOPPAGE OF SPANISH SHIPS.—The holding up of the sailings of Spanish liners this week and the stoppage of export licenses covering shipments to Spain came not unexpectedly, because it had been suspected for a long time in well-informed shipping circles that cordial relations with the kingdom could not consistently be maintained in view of certain conditions of which no secret was made before America entered the war, but which have since assumed a different aspect in so far, at any rate, as the attitude of this country is concerned. To the credit of Spain, it is to be said that the personal efforts of King Alfonso on behalf of a multitude of war prisoners and families dispersed as a result of invasion by armed forces, have endeared him to hundreds of thousands of people throughout the civilized world. But in a constitutional monarchy, such as Spain is supposed to be, the acts of the sovereign, meritorious or otherwise, have but little bearing upon the external relations of the country, and the acts of Spanish statesmen during the war have been responsible for the suspicion with which Spain is now regarded by the Allies. This suspicion is based partly upon positive, and partly upon negative, evidence. The positive evidence against Spain is based upon the fact that the peninsular has been for some two years the headquarters of the German propaganda in Europe and that the tons of pamphlets which have been distributed throughout Latin-America for the purpose of extolling the acts of the Huns in war, were written and printed in Spain and shipped thenceforth. Furthermore, Spain has taken very little trouble to prevent imports certified for local consumption to leave the kingdom, and before the system of licenses was inaugurated in this country the crews of Spanish ships were in the habit of purchasing huge quantities of fittings and engineer stores which could have been used

for no other purpose than that of supplying submarines. The recent escape of a U-boat that was supposed to have been interned in a Spanish harbor is still too recent an episode to warrant repetition and there is in the possession of the Allies conclusive evidence that some of the Spanish ships regularly engaged in transatlantic service supplied U-boats in Spanish territorial waters.—*Shipping*, 2/2.

SPAIN PROTESTS SINKING.—*King Alfonso Presides Over Cabinet as Reparation for the "Giralda" is Asked of Germany.*—The cabinet met yesterday under the presidency of King Alfonso and decided to send a strong protest to Germany, demanding reparation to Spain for the sinking of the steamship *Giralda*. The note will not be sent through Prince von Ratibor, the German ambassador, but will be telegraphed to the Spanish ambassador in Berlin.

The Spanish steamer *Giralda* was sunk by a German submarine January 26 after the crew of the U-boat had pillaged the vessel. The crew of the *Giralda*, which measured 4400 tons was saved.—*Washington Evening Star*, 1/2.

UNITED STATES

KEEL IS LAID IN RECORD TIME FOR FIRST FORD PATROL BOAT.—Secretary Daniels announces that he has received a telegram from Henry Ford, of Detroit, stating that the keel for the first of the new type patrol boats to be built in the Ford plant was laid February 6, and the side frames are ready to go up. The Secretary authorizes the following statement regarding this new type:

"The contract for these boats was given on January 17, so the keel was laid in 20 days after the contract was made.

"Mr. Ford's letter offering to build naval vessels in his plant was dated December 22, 1917. In a few hours after it was received, December 24, a telegram was sent, asking Mr. Ford to come to Washington to discuss the matter. Mr. Ford and his staff arrived in Washington December 27 at 6 p. m. The next day was spent in consultation with Rear Admiral Taylor, Chief of the Bureau of Construction and Repair, Rear Admiral Griffin, Chief of the Bureau of Steam Engineering, and other officers of the two bureaus. The Ford party then went to Philadelphia and other localities to look at shipyards and plants. They returned to Washington on December 31 for further consultation, and were given the preliminary plans and specifications of the boats to be built.

"The party returned to Detroit, and on January 8 the Navy Department wrote Mr. Ford that it was ready to hear further from him. Four days later more complete plans were delivered to representatives of the Ford Company.

"Mr. Ford telegraphed his proposition to the Navy Department on January 15. On the 17th the department telegraphed the award to the Ford Company of the contract for building a large number of the boats.

"Preparations for construction were begun at once, Rear Admiral C. W. Dyson, representing the Bureau of Steam Engineering, and Naval Constructor Robert Stocker, representing the Bureau of Construction and Repair, going to Detroit to assist the builders in laying out their plans. On February 7 the keel of the first boat was laid.

"When it was decided to build this new type of patrol boat, which possesses many of the advantages of destroyers and is as large as those of the older type, the naval constructors and engineers worked day and night and Sunday to perfect the plans, and the design was perfected in 10 days. The work was done in the Division of Design, Bureau of Construction and Repair, under the direction of Naval Constructor Stocker, and in the Bureau of Steam Engineering under the direction of Rear Admiral Dyson. A model was made and tested in the testing basin at the Washington navy yard, and all the details were completed in record time.

"The Ford Company is pushing construction at a rate that bids fair to exceed all previous records in the building of steel naval vessels."—*Official Bulletin*, 9/2.

NAVY POWDER PLANT.—Plans have been completed by the Naval Bureau of Ordnance, under direction of Rear Admiral Ralph Earle, chief of that bureau, to increase the facilities of the smokeless powder factory at Indian Head, Md. It is estimated that the sum of \$2,400,000 will be required for this purpose and Congress has been asked to appropriate that sum.

Under authority given by the President during the recess of Congress installation of additional facilities already is under way. The present capacity of the plant is 24,000 pounds of powder a day, which will be increased to 40,000 pounds by July 1 and 60,000 by November 1, with the hope of ultimate increase to 100,000 pounds.

The plant is in operation 24 hours a day and the annual aggregate output will be 18,000,000, which quantity was decided upon after conference between the naval authorities, the army officers, the war industries board and representatives of the French and British governments. The cost of production this year is less than ever before, due to improved methods and increased output per employé. The cost is about 40 cents per pound, or 13 cents less than the powder obtained under contract.—*Washington Post*, 17/2.

SHIPS BUILDING.—Nothing may be said at this time about the progress of construction of the powerful additions to our main fleet which were authorized before we entered the war. It includes five superdreadnoughts of 32,000 tons, mounting twelve 14-inch guns; four ships of 32,500 tons, carrying eight 16-inch, 45-caliber guns; and four superdreadnoughts the biggest yet planned for any navy, of over 40,000 tons, mounting twelve 16-inch, 50-caliber guns. In addition, the program includes six 35,000-ton, 35-knot battle-cruisers, and ten 7500-ton, 35-knot scouts.

We are much pleased to be able to state that the plans of the battle-cruisers have been recast so as to bring the whole of the boiler plant below the water-line. It has been found possible to do this, moreover, without adding to the length or displacement of the ships.

The expansion of the navy in general has been truly enormous. The total strength of the personnel, including the Marine Corps, on November 15, 1917, was 272,000 officers and men, and it is still growing. So far as material is concerned, the total number of vessels of all kinds has been trebled since the war began, the total number of ships now under construction being close upon 800, including every type from the submarine chaser to the superdreadnought. For the fuller details of the expansion of our navy reference is made to our liberty war number of December 1, 1917.—*Scientific American*, 5/1.

PLANS NEW BIG DRYDOCK.—*Present Naval Structure at Norfolk to be Finished in October.*—That the great drydock under construction at the Norfolk Navy Yard will be ready for occupancy before October, was the prediction to-day of Rear Admiral McLean, commandant of this naval district. The admiral also declared that plans are ready to begin work on an even larger one the moment the first is completed.

The admiral declared that the structural shops, depots, storehouses and other improvements would be completed ahead of schedules. The yard was being developed, he said, into the nation's greatest structural and industrial base, while Hampton Roads would be the navy's chief operating base.—*Washington Post*, 17/2.

INCREASE IN NUMBER OF ASSISTANT SECRETARIES OF THE NAVY.—Secretary Daniels and Assistant Secretary Roosevelt differ radically as to the need of two more assistant secretaries of the navy, as contemplated by proposed legislation, and members of the naval committees, as a result, are in a quandary as to what recommendations to make on the subject.

Mr. Daniels does not believe that additional assistant secretaries are necessary. When he was before the House Naval Committee, he explained that there is no limit on the power of the Secretary of the Navy to detail any officer, active or in the reserve, to any duty in Washington or at

any shore station. The greatly increased administrative labors have called for many more such details than would be required in ordinary times. Under the present laws, in the necessary absence of the secretary and assistant secretary, the chief of naval operations becomes acting secretary, so that on that score there is no necessity for an additional assistant.

He also stated that the administrative machine of the Navy Department is centralized and efficient, it has met the strain of war by natural and easy expanse, and, while such service as additional secretaries would relieve the secretary and assistant secretary of much arduous labor, he feels that the present system insures personal and centralized directions that might not be benefited by such division of responsibility as the creation of new offices might bring about.

A few days later, when Mr. Roosevelt appeared before the same committee, he argued with emphasis in favor of additional assistants, pointing out that one would be of value in connection with the bureau of supplies and accounts, another having to do with the personnel, and the first assistant secretary to be the "understudy" of the secretary. In this view, he was supported by Paymaster General Samuel McGowan.

Mr. Daniels also is opposed to a proposal, advanced at the Capitol, for the establishment of a new bureau in the Navy Department to look after target practice, the chief of the bureau, to be known as director of target practice, to have the rank of rear admiral. The secretary believes that the present organization is sufficient and efficient with the present office of director of target practice under the control of the chief of operations.

—*Washington Post*, 17/2.

NEW POLICY FOR NAVY YARD ADMINISTRATION.—A new policy for separating the administration of navy yards from naval districts is announced by Secretary Daniels in orders directing changes in commanding personnel.

Rear Admiral Spencer S. Wood is designated to command the first naval district at Boston, relieving Captain William R. Rush, who remains as commandant of the Boston Navy Yard.

Rear Admiral John D. McDonald is assigned to command the New York navy yard, succeeding Rear Admiral Nathaniel R. Usher, who will continue as commandant of the third naval district at New York.

Rear Admiral James M. Helm is appointed commandant of the fourth naval district at Philadelphia, relieving Captain George Cooper, who will remain as chief of staff.

Rear Admiral Augustus F. Fechteler is ordered as commandant of the Norfolk navy yard, succeeding Rear Admiral Walter McLean, who will continue to command the fifth naval district at Norfolk.

"This division," said Secretary Daniels, "which is necessitated by the magnitude of the naval activities in the districts, has for its purpose the separation of the industrial feature of the district work, which will be handled by the navy yards, from the military and marine features, which will be administered by the district commanders."—*Washington Evening Star*, 1/2.

THE WAR CABINET.—Critics of the war activities of the United States in their anxiety to find grounds upon which to base complaints lose sight entirely of the fact that in everything this nation does there must be given full consideration at all times to the necessities and the plans of our allies. Inquirers ask impatiently, "Why is this done?" or "Why don't the War Department do this or that?" And without waiting for an answer or looking calmly into the facts they frequently make charges which might be serious if warranted. The fact that in the conduct of this great world war the United States is just one of a firm, one of the junior partners at the present time, when expenditures of men and munitions is considered, does not seem to have become impressed upon the minds of many American citizens. The acts of each of the partners, the allies, must of necessity be in accordance with some definite line of action, con-

structive or destructive, that has been determined upon as that which will draw nearer the day of victory.

It is not difficult to perceive that the most vital feature of these activities at present is the maintenance of the forces that are at the front, supplying them with food, clothing and munitions, and training troops to send to the front just as rapidly as they are ready to go into the field. Plans to accomplish each of these objects cannot be worked out by the United States alone and every movement that is made must be a part of the necessary plans for cooperation. The activities of the War and Navy Departments are controlled by this purpose. The results following this cooperation have led to some criticism, but it may be safely said that nothing has been neglected that the departments had it in their power to do. That the defeat of the shipping bill two years ago is largely responsible for the shortage of transport tonnage cannot be denied and that measure was defeated by a Congress made up to a large extent of men who in the present Congress furnish some of the most severe critics of the War and Navy Departments.

There is much in the proposed war cabinet bill that sounds like the Board of Strategy which was formed in 1898 and some of the men in Congress are discussing giving the proposed new body similar powers to those held by that historic board, which won the special attention of "Mr. Dooley." These solons lose sight of the fact that in 1898 the United States was engaged in a war in which it had no allies and it had no problem of supplying anything to any other nation. They forget that any plan must have the approval of a general conference of the heads of the allied nations. There is an inclination among the critics to lose sight of the fact that representatives of the United States have met the representatives of our allies in Paris and much of the future activity of the war has already been mapped out. Future plans will be further considered in Paris or in London or in Rome. And while we shall do our part in the planning, Washington, several thousands of miles away, must be to some extent the place for the reception of orders and distribution of contracts by which the plans can be carried to final success.—*Army and Navy Journal*, 26/1.

U. S. BATTLESHIPS.—[Extract from Assistant Secretary of the Navy's speech before Harvard students.] The British Navy has the same relative strength against the German as it had at the beginning of the war. Furthermore they have the active cooperation of French and American surface ships of heavy tonnage. We have, of course, many battleships on this coast that are little heard about.—*N. Y. Times*, 17/2.

COORDINATION IN SHIPPING ADOPTED.—Coordinated direction of naval and army shipping to an extent seemingly impossible a short month ago became a reality January 30. As a result the overseas transportation of troops, supplies and the like will be greatly expedited.

All this as a result of the success which has followed the creation within the Navy Department of the Naval Overseas Transportation Service, of which Commander Belknap is the director. The new service has demonstrated marked ability in getting its ships through the submarine danger zone, and as a result of this success its tonnage was practically doubled.

The War Department announced it would turn over to the Overseas Service upwards of 2,000,000 tons of shipping which heretofore has been operated exclusively under the direction of the Quartermaster's Department. Many of these vessels are manned by civilian crews and have been under civilian masters.

The Bureau of Navigation will henceforth supply crews from the Naval Reserve, and the command of these ships will go to naval men. To all intents and purposes the vessels will be naval craft, although still performing their work for the army. And the change will mean that their efficiency will be doubled right from the start.

It was because he knew that this change was impending that Secretary of War Baker was willing to let it be known to the Senate Military Affairs

Committee that the army in France was to be materially added to within a short time. With shipping coordinated and the army and navy cooperating through vessels manned by disciplined naval men, high efficiency in overseas transport is possible. Under the old rule, with alien crews and civilian commanders, this could not have been done.

The taking over of this great amount of shipping by the navy and the manning of ships with crews from the Naval Reserve forces is considered in shipping circles one of the greatest steps toward making the United States merchant marine the equal of any in the world after the war. It means the Americanizing of all United States shipping.

In the past all ships have been manned by crews made up of aliens as well as Americans, but to become a member of the Naval Reserve the first requisite is that a member must be a naturalized citizen of the United States.

It is pointed out by those in charge of the work of taking over this merchant fleet that the crews will be thoroughly trained and disciplined according to the high standards of the navy, and that when the war is over and the ships revert to their owners, they will be returned with a full complement of men who will be given their discharge from the Naval Reserve.

Further, it is planned by Rear Admiral Leigh Palmer, Chief of the Bureau of Navigation, that where ships in course of construction are turned over to the Navy Department for operation to organize the crew in advance and have the men thoroughly trained under their future officers and ready to man the vessel immediately upon it being placed in commission.—*Baltimore Star*, 30/1.

BIG BUILDING FOR NAVY.—The new structure to be built for the United States Navy Department on the Bush Terminal property in South Brooklyn will, it is said, be the largest business structure in the city of New York. It will be 700 by 1280 feet and eight stories in height. It will be of reinforced concrete and practically fireproof, and will cost \$10,000,000. It will have a floor space of 7,168,000 square feet, or over 165 acres.

This building will be used for the storage of naval supplies and for the manufacturing, packing and shipping of goods for United States war vessels.—*Washington Evening Star*, 9/2.

NAVAL BASE AT CAPE MAY TO BE GREATLY EXTENDED.—The Hotel Cape May, which cost its builders \$1,350,000 in 1909, and which is now practically owned by Nelson Z. Graves, of Philadelphia, and George E. Matthius, of Seymore, Conn., has been leased by the War Department for hospital purposes at an annual rental of \$99,000. It has 600 rooms and is the handsomest hotel south of Atlantic City. The hotel is within two miles of the Henry Ford farm, on which is located the Wissahickon Barracks, where about 3000 Naval Reserve men are being trained, and within a mile of the Navy Department's aeronautic training station and the submarine protector base at Sewells Point.

General George W. Goethals has also ordered the State Road Commission to build a hard surface road from Keys Landing to Cape May, to have ready access to the War and Naval Department bases.

The Cape May barracks, which were built last summer, are now being doubled in capacity, so that by late spring there will be more than 10,000 men in training there.

Including the dredging of the entrance to the Cape May harbor, which embraces 500 acres, the government has expended already about \$3,000,000 at Cape May, as it is the only landlocked harbor between Sandy Hook and Norfolk. The Surgeon General's Department has reported that the Cape May cantonment is one of the healthiest training places the government has established.—*Baltimore American*, 28/1.

FOR LARGE INCREASE IN NAVY.—*Plans for Extensive Enlargement of Existing Training Stations.*—In connection with Secretary Daniels' renewed recommendation for a large increase in both temporary and permanent enlisted personnel of the navy, it is stated that the department plans exten-

sive enlargement of several existing training stations. Plans already have been approved for enlarging the Pelham Bay, N. Y., and Norfolk, Va., stations. Five thousand men are now at Pelham Bay and 16,000 at Norfolk.

The navy has 95,000 men under instruction, and, with the recommended increase, will have men enough to supply crews not only for the entire naval construction program as now contemplated, but also for the hundreds of merchant ships which are to be placed under its supervision.—*Evening Star*, 1/2.

NAVAL CREWS FOR U. S. TRANSPORTS.—It is announced at Washington that an arrangement has been come to between the Navy Department and the Shipping Board whereby all vessels used for transporting men or supplies to the American forces in France will be under the command of naval officers, and have crews of naval reservists or regular enlisted men. Up to the present, only the troop transports have been manned on this system, the horse transport and supply ships chartered for the American forces being operated by the Quartermaster's Department of the War Department, which employed merchant crews. Owing to the shortage of men in the American mercantile marine, it was not always possible to obtain a full crew of competent hands for every chartered ship, and it sometimes happened that a fast steamer could not realize her normal speed while in the submarine area, owing to unskilful stoking. Moreover, there was a dearth of trained men for lookout duty in the war zone. The new arrangement is therefore expected to add very materially to the safety of the transports and supply ships on the Atlantic route, as all these vessels will be operated by officers and men with naval training and accustomed to the high service standard of efficiency and discipline. This step has been found practicable in consequence of the great expansion of the navy's personnel since the declaration of war, so many volunteers having enrolled that, after assigning full complements to all warships and auxiliaries, complete and building, there will be a large surplus available for duty in the transport service.—*The Engineer*, 18/1.

A compromise seems to have been reached between the Navy Department and the Shipping Board regarding the personnel of the new merchant marine that is coming into being. Unlike most compromises, the plan hit upon gives promise of accomplishment, to some degree; but, like all compromises, it fails of the object ultimately to be sought. Under the terms of announcement made on December 12 the Navy Department and the Shipping Board will exercise a joint jurisdiction as follows: "The bulk of vessels under the American flag, whether engaged in the transatlantic or elsewhere, so long as they retain their character as merchantmen, will continue to be manned by merchant sailors. Troopships and vessels carrying whole cargoes of munitions or supplies for the army and navy, however, for military reasons, will be manned by naval crews."—*Navy and Merchant Marine*, January.

NAVY PERSONNEL—A CAUTION.—In all plans for the irresistible extensions demanded in the commissioned and warranted personnel of the navy the conditions and the resultant reductions in the naval establishment that must be faced after peace is declared should be kept clearly in mind. When the navy was reorganized and slowly starved almost to death after the close of the Civil War gross injustices were inflicted on the regular officers and serious harm was done to the service simply because no forethought had been exhibited.

Although less than 60 volunteer officers were, as the result of examinations open to all these gallant men, taken over, this and the yearly demotions forced by Congress blocked promotions until despair settled on the service in all grades below commander. It was the rule, not the exception, in those sad days for graduates of Annapolis to be kept in the rank of ensign for 12 years or more and for lieutenants to be held kicking their heels

without any advancement for periods varying between 20 and 22 years. In the late 80's a lieutenant less than 40 years of age was a curiosity.

At the beginning of the "present emergency," as Congressional acts euphemize this state of war, a number of reserve officers were granted temporary commissions as lieutenant commanders and lieutenants, and this before their mettle could be tested. It is recognized that the sudden and tremendous extensions in the lists of officers had to be met, and, as a consequence, in the early days haste rather than complete wisdom settled the problem. Without attempting to abridge for one moment the value of the work already performed and promised by temporary officers, who in the main have responded to the "great call" from a sense of unquestionable patriotism, it is now time for prudence to enter. Various bills are before Congress and others must follow, but previous to their enactment such safeguards should be provided that the cruel experiences following the close of the Civil War, and for many succeeding years, shall not be repeated.—*N. Y. Herald*, 8/2.

RESERVE OFFICERS' CLASS.—Secretary of the Navy Daniels visited Annapolis for the purpose of addressing the members of the second reserve officers' class of the navy upon the occasion of their completion of their 15 weeks' intensive training in the more practical branches of the activities of a naval officer.

Requests for assignments to particular ships or particular types of duty have apparently carried little weight with the navy authorities. Eight of the men will be kept at the Academy as duty officers for the third class of reservists, members of which are to be sent to New London for a four or five months' course on submarines; 60 have been ordered to torpedo-boat destroyers, about half of whom will go across in the near future; 60 will go to cruisers, gunboats or transports, and 87 will go to the Atlantic fleet's various ships. The remaining 27 will be held at the Academy for the academic board's action on their work.

The work done by the young citizen officers has been highly satisfactory to the authorities. The average mark for the entire class for the three months' work was about 79.1 per cent.—*Baltimore American*, 29/1.

SENATOR TILLMAN WANTS 10,000 AVIATORS IN NAVY.—Senator Tillman, chairman of the Senate Naval Committee, to-day introduced a bill to increase the number of naval aviators from 350 to 10,000 and raise the enlisted personnel of the navy to 180,000.

The President would be authorized to appoint temporary officers not higher than the rank of lieutenant commander in the navy and major in the Marine Corps.—*N. Y. Herald*, 29/1.

ENROLLING UNDERGRADUATES IN THE NAVY.—Instructions have been issued by the Bureau of Navigation to the commandants of the several naval districts regarding the enrollment of undergraduate students of technical universities in the naval reserve force. In order to insure the future engineering men of the navy that bureau states that it desires the enrollment of such students in the reserve. Any undergraduate between 18 and 21 years of age, who is actually taking a technical course at a technical university and who is physically qualified, may be enrolled as a seaman, second class, in class four of the naval reserve force for general service. These students will not be called to active duty until they have graduated, except in case of great emergency, which emergency the bureau does not at present foresee. No promise of commission will be given these undergraduates; and when they are graduated and called to active service they will be examined and rated according to their ability and the requirements of the service. While they are on the inactive list pursuing their studies they will be carried in the initial rating of seaman, second class. Enrolling and recruiting officers of the navy and naval reserve force have been instructed to get in touch with the technical universities.—*Army and Navy Register*, 9/2.

COAST GUARD PERSONNEL.—Temporary increased rank and pay for certain officers of the coast guard while operating as a part of the navy has been recommended by the Secretary of the Navy, and bills now are pending which contemplate such legislation.

It is proposed to put the coast guard officers on the same footing as officers of the navy. Most of those that would be benefited by the legislation now are on duty with the naval forces operating in foreign waters and they are performing hazardous duty of the same general nature as that performed by navy officers. It is believed that the coast guard officers not only are entitled to this recognition of their services, but also that the proposed legislation will facilitate command at sea, where there is bound to be contact between officers of the two services doing similar work.—*Washington Post*, 17/2.

TRAINING OF NAVAL RESERVISTS.—The next class of naval reservists to be trained at the officers' school at Annapolis will number 450, which is the limit of the accommodations there. The results of the previous training, when two classes have been graduated of about the same aggregate strength, have been most satisfactory. Reports received from Vice Admiral Sims are most complimentary in regard to the 50 men sent from the school trained for service with the destroyers. The candidates are confined to enlisted reservists, selected from the naval districts, and the competition is keen on account of the opportunities afforded for service and promotion. Many of the students are college men who entered the service for the war. Numerous inquiries have come in regard to the instruction from the *U. S. S. Harvard*, which is in the war zone and which is manned by a set of young students from the Cambridge University who belong to the same fraternity and who want to be kept together. The naval authorities, and particularly Rear Admiral L. C. Palmer, chief of the Bureau of Navigation, believe this, as that officer stated to the House Naval Committee recently, to be "a very bad idea," because it was not desirable to encourage this inclination for non-separation.—*Army and Navy Register*, 9/2.

BELIEVES 6,000,000 TONS OF SHIPPING "POSSIBLE."—Rear Admiral Frederick R. Harris, manager of the Emergency Fleet Corporation after Rear Admiral Capps left that office, told the Senate committee investigating the shipping situation he believes the estimate of 6,000,000 tons dead weight as the production for the year 1918, made by the shipping board, is "possible."

He qualified this statement by saying that it would be possible only under the most favorable conditions, in which the resources of the country were coordinated.

The estimate of only 3,000,000 tons given the committee by practical ship builders he declared to be "pessimistic."

In the end, he said, the success of the project depended upon labor, and every effort should be made to get and use all the available labor for ship-building and to educate the labor up to the understanding that it was as important to build ships as to fight in the trenches or on war vessels to win the war.

Admiral Harris refused to criticise the present organization of the Emergency Fleet Corporation and the shipping board, though urged to do so by members of the committee.

"I don't believe in criticism that is not constructive," he said.

As for his own experience with the organization, he frankly said he could not work with it when Chairman Hurley called upon him, Admiral Harris', subordinates to report in person to the chairman without notifying Admiral Harris of the fact. He explained he had been used to the military and naval way of having the subordinate officials responsible to the officer above them, and that officer to the man above him.

He said that Rear Admiral Bowles, Rear Admiral Rousseau and others, all subordinate to him, had been instructed to report to Chairman Hurley

every day about what had been done and that they, not Mr. Hurley, had informed him of these orders.

Admiral Harris said Charles Piez the present manager of the fleet corporation, and while Admiral Harris held that office a kind of executive head acting for Mr. Hurley, had explained that such a proceeding was the "difference between naval methods and business methods."

Admiral Harris said he understood when he became manager that Mr. Piez was his superior and that Mr. Hurley was superior to all. He said he had no fault to find with that and that he and Mr. Piez had gotten along well together.

He denied that he had attempted to make contracts involving \$12,000,000 for housing facilities at the shipyards on his own authority, as was published at the time he left office. He said he was convinced of the need of such an expenditure, but that he had laid the matter before his superiors.

Admiral Harris defended the fabricated ships, saying he believed when once they had begun to be turned out they would expedite the maximum output of ships.—*Washington Evening Star*, 6/2.

BUILDING AND LAUNCHINGS.—From reports received by the Shipping Board it is revealed that 901,223 gross tons of merchant ships were built in United States shipyards during 1917, being nearly double the figure of 1916. No official figures of construction in other countries during last year have as yet been received, but it is believed that we led the world in the output of new tonnage. In this connection it is of interest to note that 41 freight steamers and tankers aggregating 327,152 tons dead weight, which were commandeered by the Shipping Board last October, are expected to be put in service during this month and February and that the shipyards are making far better progress on this work than had been anticipated. Some 18 of these vessels will be commissioned this month.—*Marine Journal*, 26/1.

AMERICA TO GET JAPANESE SHIPS FOR WAR SERVICE.—The Shipping Board and representatives of the Japanese Government have about closed an agreement by which the United States will exchange one ton of steel for every two tons of shipping delivered to it by the Japanese Government and it is expected that the details of the agreement will be perfected in the near future.

Now that the United States has been pledged openly by the Secretary of War to land 500,000 men in France by next spring, it is imperative that the cargo ships of the United States be increased as rapidly as possible and that all tonnage suitable for transatlantic traffic be put into that service immediately. The negotiations with the Japanese have been dragging for weeks.

It has been known in semi-official circles for several months that the United States intended to take a much more active part in the military operations in France than was generally supposed, and it was common knowledge that the available tonnage under the control of the Shipping Board was wholly inadequate to the task of transporting supplies for the troops that were to be sent abroad. In spite of these circumstances little progress has been made in acquiring neutral or friendly tonnage.—*Evening Star*, 8/2.

FOR CHARTER OF SWEDISH SHIPS.—*Preliminary Agreement Entered Into Between the United States and Sweden.*—A preliminary agreement has been reached between the United States and Sweden, according to official dispatches from London, providing for the charter of Swedish ships to the United States to be used principally in the South American trade.

Some of the ships of the Swedish fleet now in American waters will be allowed to sail with their cargoes while others, it is understood, will be unloaded and put in the service of the United States. Negotiations are proceeding in a satisfactory manner and a final agreement is looked for shortly.

It has been decided to grant Sweden the privilege of purchasing and transporting oil cake, phosphates, kerosene oil and certain other commodities, but the chief point in discussion, the shipment of cereals and other food stuffs, has not been definitely settled.—*Baltimore American*, 29/1.

WILL CHARTER DUTCH STEAMERS.—Charter to the United States Government of all Dutch steamers now being held in American ports has been decided upon by the Dutch Government in a provisional agreement just signed in London.

The agreement provides charter for one round trip for upward of 80 vessels now in American ports. The vessels are not to go into the war zones, but five of the steamers will carry material for Switzerland and two will take cargo for the Netherlands Overseas Trust.

It is part of the agreement that the ships shall carry 150,000 tons of food for the relief of the Belgians, and may be used for other voyages later in American coastwise trade or elsewhere, possibly to Java for sugar.—*Nautical Gazette*, 24/1.

LABOR FOR SHIPYARDS.—Seeing that the passage of the administration's bill is assured authorizing the Shipping Board to expend \$50,000,000 from the funds at its command in providing housing accommodations for shipyard workers, the Emergency Fleet Corporation has now started a nationwide campaign to enlist a voluntary reserve army of 250,000 mechanics to insure the success of its shipbuilding program. This recruiting drive is being especially directed at skilled and semi-skilled workmen in industries not essential to the carrying on of the war, and labor at present employed on government contracts is not to be interfered with. On account of the curtailment in building, which is expected to last for the period of the war, the building trade is relied upon to furnish a large percentage of the required labor reserve. The automobile industry is also counted upon to supply a very considerable proportion. It has been even calculated that one-third of the workmen now engaged in garages and automobile repair shops could be easily spared for work in the shipyards. The authorities intend to have each state furnish a certain quota of the reservists needed, with the understanding that men will be employed within their home state as far as possible. Nevertheless, volunteers for the new force will be expected to pledge themselves to proceed, if so directed, to any part of the country where a demand for their services exists. What will certainly help the carrying out of the plans adopted is the likelihood of men of draft age, enlisting in the reserve, being called upon for service in the shipyards rather than in our army and navy units. To be able to render just as important a service to the nation as the men who go to the front, without having to submit to the rigors of military discipline, will doubtless appeal to many of our better-trained mechanics.—*Nautical Gazette*, 24/1.

NAVIGATION SCHOOL RESUMES.—The navigation school the United States Shipping Board is conducting in the custom house at Baltimore to furnish junior officers for the big fleet of American ships that will go into commission this year has resumed sessions under the direction of Professor Lindau. Two sessions of the school are held daily. Young men who complete the course will be placed on ships to gain experience that will enable them to pass their examinations before the board of steamboat inspectors for this district in order to be granted licenses to take officers' berths on American ships.—*Evening Star*, 21/1.

ENGINEERS TO STUDY IN FACTORIES.—Chief engineers training for service on cargo ships of the United States Shipping Board are to be sent to factories to follow the construction of the engines from the very beginning until their actual installation in the vessels to which the men will be assigned. The details of the plans are being worked out by the director of recruiting of the Shipping Board.—*Evening Star*, 21/1.

TRAINING TO DODGE U-BOATS.—*Twenty-Five Liner Captains Will Enter School Off New London.*—New London, Conn., January 21.—Twenty-five captains of ocean liners were due to arrive here to-day for intensive training in methods for avoiding U-boats. This training will be under direction of United States naval authorities. Three naval officers have been detailed as instructors, and the converted yacht *O-We-Ra* has been assigned as school ship.

Every captain has a rating that would enable him to take command of the largest of ocean-going liners. The course will last all this week in relays of three days' duration, two days of which will be occupied with lectures and the third day to actual practice in steering the yacht in a course designed to frustrate an attack by a submarine.

An American submarine will go out into the sound and maneuver, showing the periscope, and give the captains a chance to avoid an opportunity to torpedo the ship. The *Fulton* is to act as mother ship for the school.—*N. Y. Times*, 22/1.

RADIO MEN FOR MERCHANT SHIPS.—About 3000 men of the navy are in training at Cambridge, Mass., for duty as radio operators, with a view to meeting the demands for such men for naval vessels and for transports and cargo ships.

Correspondence has been exchanged between the Navy Department and the Shipping Board in regard to placing under naval control the radio men of the merchant service. This is considered necessary on those ships that have naval gun crews, and it is contemplated that the ships traversing the war zone have regular naval radio men. So far there has been little difficulty in obtaining men for this service.—*Washington Post*, 17/2.

TORPEDO PLANT BLAST NOT CAUSED BY ENEMY.—Enemy plotting was absolved of blame for the explosion in the Naval Torpedo Station at Newport, R. I., January 26, in a statement by Rear Admiral Earle, Chief of Ordnance, to-day.

"Every man in the drying room was killed," Rear Admiral Earle said, "so there is no reason to suspect the work of an enemy."

The dry house mentioned by Rear Admiral Earle was located in the former bombproof in which 25,000 detonators which were being dried exploded. The total weight of the amount of fulminate mercury destroyed was 125 pounds.

Sympathy to the families of the men "who lost their lives in the performance of their national duty" was extended by the Ordnance Bureau here to-day in a letter to the inspector of the torpedo station.—*Baltimore Evening Star*, 31/1.

OIL RESERVES FOR NAVY.—In the annual report of the Director of the Geological Survey, Department of the Interior, just made public, attention is called to the creation of two naval oil reserves in Colorado and Utah.

The survey has been investigating the oil shales of the United States that give the most promise of yielding a commercial supply of oil and has explored large areas in Colorado and Utah that contain immense deposits of such shales, some of which carry 30 to 50 gallons of oil to the ton. This potential resource is estimated by the survey in terms of billions of barrels of oil, which it is believed can be economically extracted from the shales, possibly in competition with petroleum at present prices.

The Colorado reserve created for the navy contains 45,440 acres, and the one in Utah 86,584 acres.—*Official Bulletin*, 28/12.

ORDERS TEN CONCRETE SHIPS.—Contracts for ten 3500-ton concrete ships were let to-day by the Shipping Board to the Ferrer Concrete Shipbuilding Corporation of Redondo Beach, Cal. The first vessel is to be delivered within six months and the other nine within a year.

The building company will use a new plan of construction, recently patented, by which it can build the vessels more rapidly than under old methods of working concrete.—*N. Y. Times*, 3/2.

ASKS SYSTEMATIC SURVEY OF ENTIRE PACIFIC COAST.—Although it will take 20 years to complete the surveys of the entire Pacific coast proposed by the coast and geodetic survey in a bulletin issued, benefits would be available within a year after the work was begun, the survey says.

For 21 years no systematic survey of water areas adjacent to California, Oregon and Washington has been made, says the bulletin. The cost for a vessel to do the work and 20 years' operation is estimated at \$2,300,000.

Not only consideration for lives and property, but the need of preparing for maritime expansion dictates the necessity for beginning the survey immediately, in the opinion of the survey. The bulletin concludes:

"The end of the present world conflict will see the merchant fleet which we are now building released from the restrictions imposed by our need for transatlantic transport, sailing the seven seas in a struggle to regain the pre-eminence which was ours in the old days of the clipper ships."—*Washington Evening Star*, 24/1.

FIRE KILLS TWO MEN ABOARD DESTROYER.—An oil fire in the engine room of a destroyer, resulting in the death of two water tenders, Martin O. Callaghan, of Columbus, Ohio, and Charles E. Bourke, of Worcester, Mass., was announced by the Navy Department. No details were published.

The department also announced that Hector N. Menard, seaman, of Bridgeport, Conn., had been killed by a heavy sea dashing over the transport *Hancock* during a recent storm.—*N. Y. Herald*, 24/1.

TELLS OF FINDING EMERY POWDER IN GYROSCOPE.—Emery powder was found in a bearing cup of a gyroscope ready for shipment to the United States Navy to be used in a torpedo, according to the testimony of Charles Teitelbaum, government inspector at the E. W. Bliss Company's plant, when the trial of Paul Hennig on a charge of treason was resumed before Judge Chatfield in United States Court, in Brooklyn, yesterday.

Under cross-examination by Arthur K. Wing, Teitelbaum said that following the discovery on November 12 last he had approached Hennig and asked the latter to disassemble that gyroscope and that Hennig had sent him to a workman. He admitted that 10 days before Hennig had brought back a bearing passed in inspection and had shown that it was soft.

Ensign Joseph A. Flynn, of the *Arkansas*, told of the workings of gyroscopes in torpedoes. The trial will be continued to-day.—*N. Y. Herald*, 30/1.

AMERICAN AIRMEN BOMBARD GERMANY; ALL RETURN SAFELY.—*Four Aviators Unable to Determine Extent of Damage They Did Owing to Heavy Fogs.*—With the American Army in France, Sunday (Delayed).—Four American aviators attached to a French squadron have participated in a daylight bombing raid over Germany. All returned safely.

Because the weather was foggy the aviators were unable to determine just what damage was done, but as they flew fairly low over the targets it is believed the results were good. After recrossing the lines the bombers were fired upon vigorously by enemy anti-aircraft guns. They then ran into still heavier fog, and some of the airmen were forced to land before reaching their hangars.—*N. Y. Herald*, 29/1.

MAY CALL FILIPINOS INTO SERVICE.—Authority to call into the United States service Philippine military organizations is given the President in a House bill passed yesterday by the Senate and sent to the White House.—*Evening Star*, 19/1.

TRAINING CAMP FOR PORTO RICANS.—Secretary Baker to-day announced the establishment of a second officers' training camp in Porto Rico, for 400 selected Porto Ricans. The camp will open February 1 and run three months.—*Evening Star*, 9/1.

TEACH WAR PHOTOGRAPHY.—*Columbia Announces the Opening of a New Department.*—Columbia University announced the organization of a School of Military Cinematography for the United States Government to train war photographers. The school, the only one in the country, will enroll 100 students and will be under military regulations. It is assumed that the students will be drafted men who have had experience in photography. A faculty of seven military men will give instruction.

The men will be quartered at the university, sentries will be posted and no student may leave the school without a military pass.—*N. Y. Times*, 9/1.

The United States Army in France will total 500,000 early this year. Pershing has taken over a section of the front in Lorraine, where the



THE REGION BELOW VERDUN IN WHICH EARLY ACTION MAY TAKE PLACE.

American troops have been engaged in the usual trench raids and have shown up well in the fighting. The artillery is reported to be doing excellent work.

MEXICAN SERVICE BADGE.—Officers and enlisted men who participated in the Vera Cruz expedition under the late General Funston, the punitive expedition into Mexico under General Pershing, or who have under certain conditions served on the Mexican border patrol will be eligible to wear a new service badge with ribbon, which has been authorized by the Secretary of War, with the approval of President Wilson. The following general order issued by the War Department states who will be permitted to wear the new badge:

"1. By authority of the President, a service badge with ribbon, to be known as the Mexican Service Badge, will be issued to all officers and enlisted men who are now, or may hereafter be, in the military service of the United States and whose service has been under the following conditions:

"(a) In Mexico, afloat or ashore, as members of the Vera Cruz expedition, between April 24, 1914, and November 26, 1914.

"(b) In Mexico as members of the punitive or other authorized expeditions between March 14, 1916, and February 7, 1917.

" (c) Those who were actually present and participated in an engagement against Mexicans between April 12, 1911, and February 7, 1917, in which there were casualties on the side of the United States troops.

" (d) Those who were present as members of the Mexican border patrol, between April 12, 1911, and February 7, 1917, in proximity to an engagement between Mexicans which resulted in casualties among their own company, troop, battery, or detachment.

" 2. The distribution of this badge will be governed by the provisions of Article VIII, Compilation of General Orders, Circulars and Bulletins, War Department, 1881-1915. No individual will be entitled to more than one Mexican Service Badge.

" 3. Persons not now in the Army of the United States, who, if they had remained in the service would be entitled to this badge, and whose separation from the service has been honorable, may apply to the Adjutant General of the Army for authority to purchase and wear the Mexican Service Badge."

The badge will be of bronze, one and one-fourth inches in diameter. On one side will be the Mexican yucca plant in flower, with mountains in the background as suggestive of Mexico. Above the yucca plant are the words "Mexican Service," in the upper half and the lower half "1911-1917" arranged in a circle. The reverse side is the same as the Indian war badge. The ribbon is of silk and shows these colors in the order named, green, yellow, blue, green.—*N. Y. Times*, 15/1.

AIRPLANE PRODUCTION.—Whatever may be the popular opinion of Fuel Administrator Garfield's order suspending business to relieve the coal situation, the wisdom of his rule exempting the airplane industry from the restrictions of his proclamation will be generally recognized. It would have been lamentable had the construction of aircraft been checked for a day, or even an hour.

We know now that we are not to have 100,000 planes in the air this year, nor anywhere near that number. In a recent statement Howard E. Coffin, Chairman of the Aircraft Production Board, exposed the futility of this hope, a hope based on the knowledge of America's industrial achievements of the past and the conviction that, in the building of weapons to strike Germany through the air, effort would be strained to the utmost.

The experience of our allies has shown that the maintenance of each machine at the front necessitates the employment of between 40 and 50 men in auxiliary branches of the service, or an army of more than 4,000,000 in the aviation service alone, were this hope to be realized.

But the shock to us of this enlightenment was probably no shock at all to those who have looked, and still look, to us for help in destroying, once and for all, Prussian militarism.—*N. Y. Times*, 20/1.

GENERAL STAFF REORGANIZATION.—The reorganization of the general staff, as announced in a bulletin from the War Department last week, was necessary, not only to meet the conditions of war, but also because the general staff had ceased to perform the functions originally intended to devolve upon it. It has departed so far from the object contemplated by Elihu Root, who was Secretary of War when it was created, as to have become a part of the executive machinery of the War Department.

In addition, it has intervened between the Secretary of War and the bureau, and has separated the experts of the staff corps in the War Department from the head of the department until the latter has come to depend almost entirely upon the chief of staff for his information of army conditions and needs. The result has been a Secretary of War that not always has possessed a knowledge of the military situation, save as it may have been imparted to him by general staff views or incorrectly obtained through an imperfect acquaintance of general staff members with the situation.

Further, the personnel of the general staff has changed to such an extent since commencement of the war, due to the natural desire of members to be

relieved for duty in the field and with the line, that the permanence of membership, at one time regarded as so essential to successful administration, has been lacking.

The introduction of the war council into the War Department machinery has been bewildering, and this is not lessened by any of the War Department bulletins that have sought to explain the relationship between the general staff and the war council.—*Washington Post*, 17/2.

ENLARGEMENT OF THE DRAFT AGE LIMITS IN FUTURE SELECTIVE SERVICE ACTS ARE DISCUSSED IN GENERAL CROWDER'S REPORT.—Discussing the enlargement of the age limits for selective military service, Provost Marshal General Crowder says in his report to the Secretary of War:

Should the class of draftable persons in future drafts be enlarged or diminished, as to the ages to be included?

A pronounced majority of the boards favor some enlargement, but there is great diversity of opinion as to the proper age limit. Nineteen and 35 are perhaps the limits most frequently suggested; but some recommend 40 or 45 years as the upper limit. There is a distinctly stronger demand for raising the maximum age than for lowering the minimum.

The reason given for advocating this enlargement is the fact that there are many good men under and over the present limits who could more easily be spared than an equal number within the limits.

The following additional suggestions are made by a number of boards: (1) That young men who are under age should come within the law when they reach the minimum draft age; (2) that young men of 18 or 19 should be enrolled and trained, so as to be ready for active service immediately upon attaining draft age.

It is obvious that we are at the threshold of this problem in our further provision for the conduct of the war, and that a wise foresight should be employed in settling it.

The two most important preliminary inquiries are: What are the numbers of available men in the additional age-groups? Which groups can we least afford to draw from?

Available Numbers by Groups.—The available numbers are as follows:

Male population available 1918:

Males, 31-45 years, both inclusive (estimated).....	10,683,249
Males, 21-30 years, both inclusive, not yet called.....	6,503,559
Males, 18-20 years, both inclusive (estimated).....	3,087,063
Males arriving at age 21, between June, 1917, and June, 1918 (estimated).....	1,000,000

Inasmuch as most (96 per cent) of the age 18-20 group are not married and most (77 per cent) of the age 31-45 are married, it will serve sufficiently the purpose to estimate the number of single persons available in each of these groups, and then to take the probable number of acceptances, as shown by the percentage of acceptances in the first draft. This estimate results as follows:

Probable acceptable men in age groups	Gross number	Probable acceptables Per cent	Net numbers
Single males 31-45 years (estimated).....	3,525,472	39.41	1,389,388
Single males 21-30 years not yet called.....	3,354,086	39.41	1,321,845
Single males 18-20 years (estimated).....	2,963,581	39.41	1,167,947
Single males arriving at age 21 (estimated)...	960,000	39.41	378,336
Total	10,803,139	....	4,257,516

These figures show us the respective sizes of the available reservoirs to be drawn from.

In considering the grounds of preferences for the two groups not now liable to service, conflicting considerations meet us. The younger men are

generally deemed to make the soundest and most pliable military material. On the other hand, the older men are more likely to yield in large numbers the occupational skill so necessary in the varied composition of the modern army. Moreover, under the rational selective-service system, which seeks to distribute the burden equally among the willing and the unwilling, it is important, if not essential, to include the older men, because a smaller proportion of them are likely to enlist; *i. e.*, to enter the army voluntarily without waiting for the call of the law. If the age limits were not enlarged to include the older men for raising the needed numbers, too large a proportion of the younger and more aggressively patriotic men would be withdrawn from civil life, thus unduly injuring the coming generation.

In view, however, of the considerable number of men already available under the law, the main reason for enlarging the age limits at this time is to distribute the burden more equally, in preparation for a later situation of need that may arise. From this point of view, the extension might well be both upward and downward, by way of a registration of all ages 19 to 21 and 31 to 45.

In any event, the greatest caution should be exercised not to interfere with the technical training of the younger group of men. The higher training should be protected from undue inroads; for it is there that the practical sciences are being developed. Both war and industry must be able to count upon a continuous and ample supply of trained young men. The experience of continental countries here has its lessons for us. The technical courses should not be allowed to be gutted. Already, by volunteering alone, many or most colleges have lost (on the average) 50 per cent of their students. The number at stake is not large in respect of the mere man power of the army, but it is potent in its possibilities for service if properly trained.

A wise expedient would be (if the age limits are lowered to 18 or 19). (1) to require every technical student in a recognized college to enter the enlisted reserve corps, and to relieve him from call by a local board during the completion of his course; (2) to require every such student to take a course of military instruction and drill for each of such years, or to enter an officers' training camp during the summer; (3) to appropriate the sums necessary to provide military instruction and drill at every college furnishing a unit of 100 men. By this means, the vital demand for educated young men could be filled, and at the same time their preparation for military service when needed could be insured.—*Official Bulletin*, 25/1.

ORDNANCE AND GUNNERY

SUBSTITUTES WOOD FOR COTTON IN EXPLOSIVES.—A discovery which may revolutionize the munition industry in this country was announced recently, when it was declared that wood cellulose had been used successfully for the first time in the United States as a substitute for cotton in the manufacture of explosives. W. E. Byron Baker, a chemist, of Lockhaven, Pa., announced the discovery in a paper read at the third annual convention of the American Paper and Pulp Association at the Waldorf-Astoria.

The importance of the discovery can be realized by the fact that if German scientists had not made a similar discovery soon after the war began the German nation probably would be without means of producing explosives in necessary quantities, as cotton imports have been shut off from that country for nearly two years.—*N. Y. Herald*, 7/2.

A SHELL THAT WILL NOT RICOCHET.—The "non-ricochet" shell, a missile as deadly as the depth charge, is the newest device perfected by the navy ordnance experts for use against German submarines.

The new shell dives when it strikes the surface of the water instead of bounding, as do the ordinary missiles used in either naval or coast defence



HEAVY ITALIAN GUNS BOMBARD ENEMY TRENCHES FROM MIDSTREAM IN LOWER PIAVE.

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artillery. In addition, through the use of a new fuse the charge can be made to explode on contact with a solid surface under the water or at a predetermined depth.

The value of the latest anti-submarine weapon lies in the fact that shots which fall slightly short will be of as much effect as those which register direct hits. Pursuing its course beneath the water, the shell will explode against the side of the submerged submarine. Similarly, when these shells are aimed at a periscope of a submarine headed bow-on, there is a material increase in the chances that an overshoot will take effect somewhere along the hull.

The Navy Department has forbidden the publication of details of the invention, but it is known that the British and French admiralities also have adopted it.—*N. Y. Times*, 23/1.

MINE SWEEPING DEVICE.—A mine sweeping device, calculated to pick up and safely bring to surface any mines that may be in the path of vessels is now being attached to a number of ships proceeding through the waters of the war zone. It is attached to the bows and when let down a netted projection extends a dozen or more feet on either side of the ship. If a mine is encountered it is picked up and brought to the surface at a safe distance from the vessel.—*Evening Capital*, 12/2.

NEW ARMY RIFLE.—Many favorable reports are being received with regard to the 1917 model United States shoulder rifle, which now is being produced at a greater rate than rifles ever were produced before in any country and in quantities sufficient for all troops that we may raise.

The rifle is modeled after the British Enfield, which used a rim cartridge of .302 caliber, but it represents many improvements over the British piece and is adapted to fire the caliber .30 rimless cartridge used in the Springfield rifle and in the machine guns used by the army, navy and marine corps.

Although those who have been instrumental in the design and the overcoming of the stupendous production problems incident to the turning out of the new rifles in quantities, are reluctant to speak of their accomplishments, they feel that they have done more than even they themselves expected, particularly in the rate of production that now has been reached.

Enough rifles are available for all troops in the service on duty that requires them. If there are any troops that have not been armed with the rifle, of either the Springfield or 1917 types, it is because of transportation difficulties, and not because the ordnance department has failed to have them ready in time. The new rifle will be ready in sufficient quantities for the men of the second draft by the time they require them.

Among other charges that have been made with respect to the new rifle is that the delays incident to the adoption of a new type have resulted in many troops being unarmed, it being stated that at some of the camps fully 50 per cent of the men had not received rifles. While it is not permitted to state exactly what proportion of troops are required to be armed with a shoulder rifle, although, of course, that is well known in the service, it should be remembered that every army has a large number of non-combatants who do not carry a rifle, and that many of the combatant classes are engaged in field artillery and other work in which they have no need for such a piece.

Considerable criticism also has been directed against the ordnance department because of its insistence that there should be a reasonable amount of standardization or interchangeability of parts of the rifle in order that replacements of those easily removed and apt to become injured or defective could be made readily. This policy was followed only to the extent absolutely necessary, that manufacture of the rifle might not be retarded any more than essential to the production of a proper arm.

As a matter of fact, there are only seven parts of the rifle, instead of 57 as has been charged, for which it is prescribed that there shall be no

départure under any circumstances from such perfection as would permit interchangeability, although the specifications set out other parts for which interchangeability is desirable. Of course, any one that has no acquaintance at all with a small arm knows that a bayonet, for example, should be capable of being placed on any rifle and should not be such that it can be used only on the one with which it is issued; and those that have handled a rifle at all know that the bolt of the breech mechanism and magazine, for example, should be capable of transfer from one rifle to another. As was anticipated by the ordnance experts, there is criticism now on the other side—that is, to the effect that interchangeability has not been carried far enough.

The favorable reports coming in from troops using the rifle confirm the ordnance experts in their belief that the United States in the 1917 piece has the best small arm in the world, with the exception, perhaps, of the Mauser type of rifles used by the Germans, and that our small arm is in every way equal to that of the Germans.

The policy has been adopted of placing a rifle expert of the commissioned ordnance personnel on duty at every camp to which the new rifle is sent, in order to aid troops in its use. Major Smith W. Brookhart, of the Ordnance Reserve Corps, who has been on such duty at Camp Dodge, Des Moines, Iowa, reports that unusually high scores have been made in practice with the piece.

In one colored regiment, for example, an average of 44 bull's-eyes out of a possible 50 was made at a range of 100 yards. This is thought to be due, among other things, to two factors: First, the placing of the rear sight on the bridge of the receiver, and thereby bringing it 10 inches nearer the eye than on the Springfield rifle, and increasing the sight radius or distance between the front and rear sights; and, second, the open peep-sight, whereby the soldier automatically centers his eye at the center of the rear sight.

While at Camp Dodge, Major Brookhart conducted instruction in the use of the new piece, which was attended by members of the personnel of all grades, from general officer to private.—*Washington Post*, 17/2.

OUR NEW 16-INCH NAVAL GUN.—Admiral Earle states that a 16-inch 50-caliber test gun is practically completed at the Washington Navy Yard, and that it will be proved within the next two months. Twelve of these powerful pieces will form the armament of our new 42,000-ton 23-knot battleships. He also says that the bureau has ascertained that the life of the large-caliber gun has been underestimated, the 14-inch 45-caliber gun having been fired a number of rounds far in excess of that heretofore considered to be practicable. We presume these good results are largely due to our most excellent powder, which, being a pure nitrocellulose powder, has much less erosive action than those containing more or less nitroglycerin. This is a most valuable quality, for it will mean that the new 16-inch 50-caliber gun above mentioned can be given a velocity considerably greater than would be possible with some other powders, such for instance, as the English cordite. We do not know, of course, what this velocity will be; but it is conceivable that (thanks to our powder), we may be able to maintain a muzzle velocity of 2800 feet per second, and still get a reasonable accuracy-life out of the gun.

Not many people outside of ordnance circles understand what an intimate relation there is between the powder and the gun—that is to say, how greatly the efficiency of any weapon is tied up with the all-round efficiency of the powder. Evidence of this is seen in the fact that the new British 15-inch naval gun is only 40 calibers in length and has a muzzle velocity of not much over 2300 feet per second. This means that the British 18-inch gun is probably not over 40 calibers in length, and that its muzzle velocity is about the same. If this be so, it is evident that the question of erosion, which has always been a most serious one where cordite is used, has very largely controlled the design of the gun. High muzzle velocities, other

things being equal, mean a high rate of erosion, and low velocities mean relatively light erosion; and if they are getting only about 2300 foot-seconds out of the new 18-inch gun it would indicate that the British powder still contains a certain percentage of nitroglycerin. Now if, as we hope, the Navy Department intends to secure 2800 foot-seconds with the new 50-caliber 16-inch piece, its shells, weighing probably about 2200 pounds, will have a penetrating power at all ranges at least equal to that of the English 18-inch piece, whose shells must weigh, surely, not less than 3000 pounds. The trajectory of our gun will be much flatter, and until the developments of the present war, this would have been considered a great advantage.

But due to the extreme ranges at which actions are now being fought, the angle of fall is so steep as to bring extreme-range attack within the category of "high-angle" or "plunging" fire, and, as we showed in an article in our issue of April 7, 1917, it is not so much the side as the deck of a ship that is vulnerable to such attack. The angle of fall of the lower-velocity shells of the 18-inch gun will, of course, be much steeper than that of the high velocity 16-inch shell of our guns. The danger space of our shells will be greater and more hits will be made; but the 18-inch shells that do hit will strike the lightly-armored deck rather than the heavily-armored side of the enemy—so there you are.

The range of our gun is probably greater, as is also the danger space; on the other hand, there is no question that a 3000-pound shell falling at an angle of say 25 to 28 degrees, if it hits, would endanger the flotation of a ship more than a 2200-pound shell striking at an angle of from 18 to 22 degrees, even though the latter carried a higher velocity.

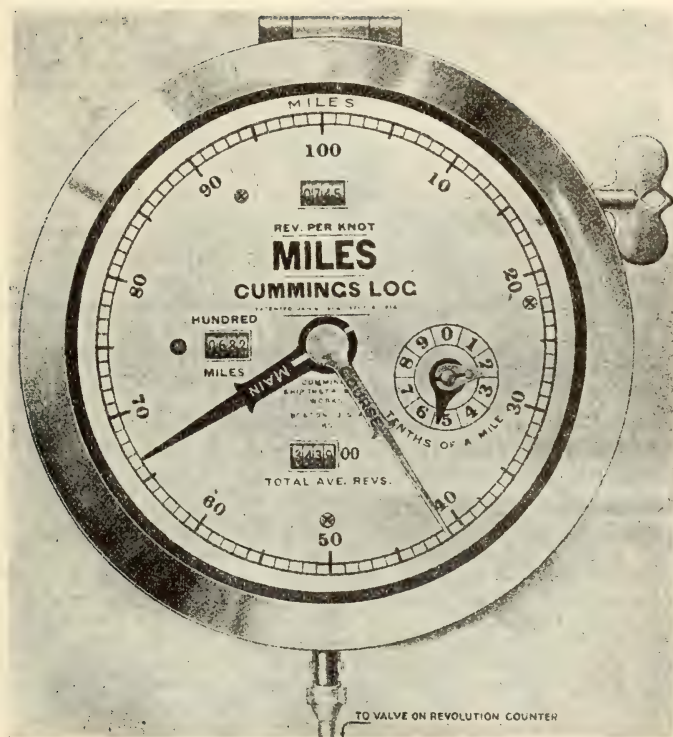
This is an interesting question, and there is much to be said on both sides. Personally we prefer our battery of twelve 50-caliber 16-inch to one of eight 40-caliber 18-inch guns.—*Scientific American*, 19/1.

A FRENCH BIG BERTHA.—According to a correspondent of the *Washington Post* in France, the French have outbuilt the German big Bertha of 42 centimeters caliber, and their artillery now includes the 52-centimeter mortar. He states that the length of the new gun is such as to render this piece practically a howitzer. The same authority states that one of these pieces was used in the Verdun surprise attack of last August, and also in the Chemin-des-Dames attack in the neighborhood of Laon, where its huge projectiles wrecked the entrances to the quarries and prevented the men inside from reinforcing the first-line troops engaged with the enemy. Two shells from the "52" sufficed to wreck Fort Malmaison.—*Scientific American*, 9/2.

NAVIGATION AND RADIO

AN EFFICIENT INSTRUMENT.—The Cummings log for passenger, cargo and battleships, torpedo and patrol boats, and for submarines and yachts, manufactured by the Cummings Ship Instrument Works, 110 High street, Boston, is illustrated on the opposite page. This instrument shows directly the total miles traveled by the ship. The "hundred miles" reading is given on the small dial at the left, the miles by the main hand on the large dial and tenths of miles on the small dial at the right. The log shown reads 58,266.5 miles. The course hand on the large dial indicates that the ship had traveled 41.2 miles since last set to zero. This hand, which is carried by friction on the shaft of the main hand, can be set back to zero at any time without altering the main reading.

On the bottom of the large dial are given the total average revolutions of the engines. The small dial at the top labeled Rev. per Knot is set to the number of revolutions of the propeller necessary to drive the ship one mile through the water. The removable key at the right is for altering this ratio as conditions change. A mere glance at the dial of a Cummings log enables the navigator to secure accurate results when running by dead



THE CUMMINGS LOG.

TIME ZONES AT SEA.—There are several matters of time reform in the air (or on the carpet, as the French say), one of which, at least, will probably be realized in the not distant future, for the scheme is already well advanced. This is a proposal to extend the hourly zone-time system, generally used on land, to the ocean, and the suggestion is that time should be kept according to this system both on the vessels of the navy and of the mercantile marine. The scheme originated with our French allies, who have decided to adopt it in their navy, and it has been discussed at an official conference in England by representatives of many important interests. The actual proceedings at this conference have not been made public yet, but there can be no impropriety in giving the substance of a note which appeared in the *Comptes Rendus* of the Paris Academy for July 23.

On board ship there are timekeepers of two kinds. There are chronometers for the purpose of navigation, which naturally show Greenwich time, and there are the clocks in use for the every-day life of the ship, which are set day by day, more or less at the discretion of the captain, but, speaking generally, show the local time of the place where the ship happens to be. It is this latter class of instruments to which the reform is to apply. It is proposed that the clocks on board ship shall always show a time which differs an integral number of hours from Greenwich time. The clocks need not be altered immediately on entering a new time-zone; but this will be left, as before, to be controlled by circumstances. These clocks, however, will always show the time of some hour-zone—preferably that in which the ship then is, and the number of the zone that the clock is then keeping is to be exhibited beside the clock; and in any entry of time made from the clock, in the ship's log or elsewhere, the number of the zone is to be entered. The numeration of the zones was discussed at the conference, and it has been decided that they should be +1, +2, +3 . . . West from Greenwich, -1, -2, -3 . . . Eastward. All this may seem rather unimportant, but the result of the change will be that Greenwich time can be deduced from the clock time quite easily; and it has been decided that in the case of wireless messages the time of sending shall always be given in Greenwich time, which illustrates the purpose of the new scheme.

The other reforms referred to above emanate from this. It is proposed in the first place that the astronomical day shall be made to agree with the civil day; or, in other words, that in the National Ephemerides the day shall begin at midnight, which is to be 0 hours, and the hours are to be numbered from 0 to 23. The alteration of the astronomical day is a very debatable matter, and the Astronomer Royal and Professor Turner are the joint signatories of a letter in the *Observatory Magazine* of this month, which asks for the opinion of astronomers on the point. More than 20 years ago this same question was under discussion, but nothing materialized. The cognate question of numbering the hours of the civil day from 0 to 23, which was also discussed at the earlier date, will probably again arise.—*Scientific American*, 5/1.

DAILY WIRELESS SERVICE BETWEEN ITALY AND U. S.—Direct radio communication between an Italian Government station in Rome and the Arlington station of the United States Navy here has been successfully established, and daily use is being made for communications passing between the two governments.

The daily statements of the Italian war office will be received by radio from Rome and issued here for publication in the United States.—*Evening Star*, 22/1.

U. S. RADIO STATION IN FRANCE.—The Navy Department is erecting a high-power radio station in France at a cost of \$2,250,000, which will be ready for operation in August next. The French Government will take it

off our hands after the war is over. It will be used in connection with the great station fast nearing completion at Annapolis, which will be three times as powerful as the one at Arlington, Va. The present French stations are not powerful enough to get communication across the Atlantic Ocean, being of about the same power as the station at Arlington. All of the equipment and structural parts are being made in this country for the foreign station. A station is also being built in Porto Rico. The British are establishing a high-powered station in the Azores, which will be valuable as a relay station. At present about 30,000 words a day are possible by wireless, and the new station at Annapolis will add 50,000 words per day. The greater part of the communication at the present time is by cable. If the cables are cut, it is estimated that the Annapolis station and Sayville and Tuckerton would probably be able to take care of all absolutely necessary military business. There is but little necessity for the use of the Pacific coast stations at this time, as practically all of the naval operations are on the Atlantic coast.—*Army and Navy Journal*, 2/2.

ENGINEERING

LIBERTY MOTOR A BRILLIANT SUCCESS.—One of the latest and most insidious efforts of enemy propaganda to spread discouragement among the civilian population back of the fighting lines is seen in the persistent rumor that the Liberty motor is a failure, and that the output of airplanes is small and far behind the promised program.

We are in a position to state that not only is each of these statements a deliberate falsehood, but that the motor has exceeded the most optimistic forecast of its performance, both as to horsepower delivered and durability, and that the output of planes is keeping pace with the construction of motors. Both motors and planes are being built at a pace which ensures delivery in 1918 at the rate proposed when the appropriation of \$640,000,000 was authorized for their construction.

The work of translating this vast sum, with the greatest possible speed, into a fleet of airplanes and enlisting and training the personnel, so that we may be prepared to launch a great aerial offensive against the enemy in the summer of 1918, is in the hands of the Aircraft Production Board under the chairmanship of Mr. Coffin, and the Signal Service Corps of the army under Brigadier General Squire. The enterprise has been greatly favored by the fact that, in the matter of organization, and in the personality of these two men, it is singularly free from that red tape and professional inertia which has proved so disastrous in some features of our military preparation. The public will be gratified to know that the whole of this vast work, entailing expenditures at the rate of \$50,000,000 a month, is swinging along harmoniously and swiftly to its completion at the date assigned.

We have already emphasized the fact that, although the motor is American in type and design, it embodies the best of the accumulated experience of the British, French and Italian aeronautical experts. Our engineers had before them even the designs of the very latest German motors; something that was made possible by captures of enemy machines on the western front. For these reasons it is not surprising that we should have produced a motor which is a distinct advance upon anything as yet turned out on either side of the fighting front.

Since "time is the very essence of this contract," it was obviously desirable to design a standardized motor, which would lend itself to that quantity production which has made possible the enormous output of American factories, and particularly of those devoted to the automobile industry. And in spite of the widespread belief that the building of motors for military airplanes could be done only in such highly specialized individual plants as are found in Europe, the tests (severe and prolonged) to which

the Liberty motor has been subjected prove that an equally fine product can be made by our quantity-production methods.

It has been urged that, in view of the rapid improvement in military aircraft, it was inexpedient to tie ourselves up to a single type which, however good at the date of its design, might be outbuilt by the time our new fleet was completed. In answer to this it should be noted that the Liberty motor is to-day well in advance of current practice. Thus, the celebrated Rolls-Royce (according to Major Vincent), which weighs 950 pounds "has never authentically developed more than 360 horsepower"; whereas the Liberty motor develops more than 400 horsepower at 1625 revolutions, on a total weight of only 800 pounds.

In view of these facts, coupled with the severe tests to which it has been put, it is not surprising to learn that the allied governments have placed large orders in this country for the new motor.

Not only is the motor "ahead of the game" in respect of its output per weight and total output, but, at a recent meeting of the Society of Automotive Engineers, it was stated by Charles M. Manly, vice-president of the society, that "the men who are in charge of the government's aircraft program have made every possible provision for the improvement of the design with the least possible interference with production." In other words, it will be possible to introduce new features or improvements on later lot orders, "so that the government will never be tied up with a lot of obsolescent machines in process of manufacture."

Mr. Vincent states that the new motor is to be used on the machines of every type—speed scouts, battleplanes, observation and bombing machines and seaplanes: though these now being built are intended for heavy battle and bombing planes. There are two varieties: one for use at very high altitudes, another for seaplanes operating near sea level.

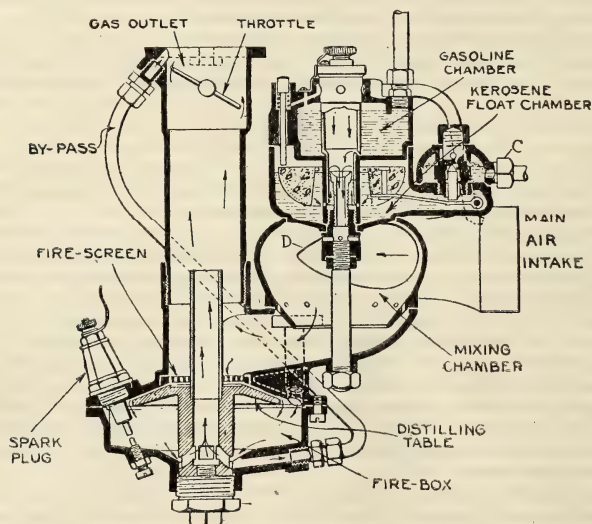
The tests of endurance have given the following results: The engine designed for altitudes of three or four miles have been run at sea level for eight consecutive hours without showing any weakness. On the other hand, the high-altitude engine has been tested in the vacuum chamber of the Bureau of Standards, Washington (where conditions of air pressure and temperature corresponding to an altitude of 35,000 feet can be obtained), for 50 consecutive hours.

At the same meeting Colonel V. F. Clark, head of the Section of Experiment and Design of the Army Aviation Service, asserted that if America obtained sufficient aerial superiority to send out a fleet of 500 bombing machines to destroy German lines of communication, there would not be much left of the war.

Undoubtedly; and when the full measure of our manufacturing capacity comes to be applied—as it ultimately will—we shall be in a position to send over the enemy terrain not one, but many raiding fleets of 500 machines each.—*Scientific American*, 26/1.

CARBURETOR WITH SPARK PLUG; A NEW DEVELOPMENT FOR VAPORIZING KEROSENE.—Mention has previously been made in these columns of the kerosene carburetors which operate on a partial combustion principle in which a portion of the liquid was burned to make a gas of the remainder of the vapor passing through the mixing chamber. In view of the interest prevailing at the present time in the action of various devices intended to burn kerosene, and inasmuch as there is apt to be shortage of gasoline as the result of the abnormal demands of war time conditions, particular interest is evidenced now in various types of kerosene vaporizers. In the form illustrated in the accompanying diagram, it will be evident that heating the mixture and securing heat to vaporize the heavy fuel is obtained by utilizing a portion of the carburetor as a fire box and putting a spark plug in this portion in order to secure the kindling of the gas when it is desired to start the engine after it has been standing for a time. This does not correspond to or is it a part of the mixing chamber, but is located

below it, so that the heated air and mixture from the preheating chamber rises through a stand pipe to go directly past the throttle. Since the heat is provided in the carburetor itself, there is no need of a hot air pipe from the exhaust manifold, nor is it necessary to jacket the carburetor. Gasoline is used for securing an easy start and priming so there is incorporated with the carburetor a gasoline supply reservoir above the float chamber through which the kerosene passes, so that the gasoline can be allowed to drip into the mixing chamber for starting purposes. The novel feature of using a spark plug in the carburetor is not a radically new one, inasmuch as it is covered by an English patent issued several years ago. A special form of spark plug is used, having but one electrode, this registering with a corresponding electrode screwed into the fire box body.



A KEROSENE CARBURETOR WITH A SPARK PLUG.

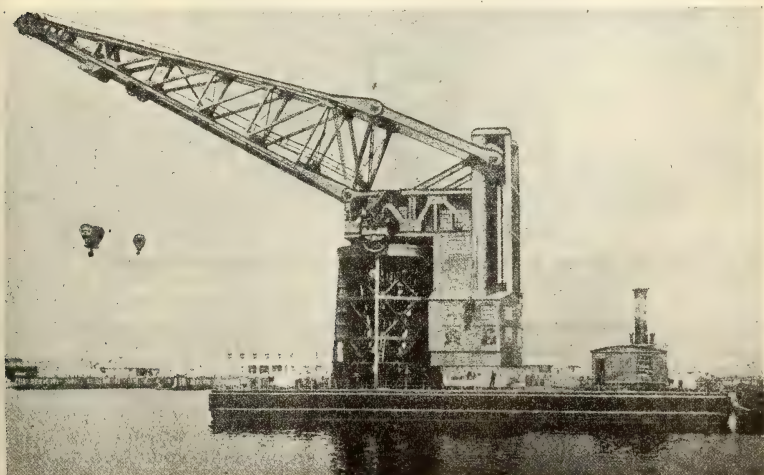
The fire box *J* is located at the bottom of the carburetor and contains an umbrella-shaped metal piece, *K*, known as the distilling table. The spark plug is connected in series with one of the plugs of the engine, so that with the four-cylinder engine there would be a spark plug in the fire box for every fourth spark in the engine. The fuel supply is directed to the float chamber in the conventional manner, the level therein being regulated by the usual float control mechanism. The gasoline supply is carried in a separate chamber above the float chamber. This chamber is filled through the action of a priming lever as the contents flow through the nozzle and into the air current by gravity. The current passes through the float chamber down through the nozzle and from there through four openings in the mixing chamber *D*, at the bottom, so that the fuel falls to the bottom opening into the curved surface *R* and falls from there to a baffle plate or supply screen *H*. Here it falls through the openings of a screen and drops to the top of the distilling table *K* and begins to float down the inclined surface of this table into the fire box, where it is ignited by the spark gap.

Only partial combustion occurs owing to there being an excess of fuel present and the resulting gas is drawn up through the fire box, through a vertical passage, back into the main stream of air from the mixing chamber and by the throttle which controls the amount of gas admitted to the engine.

It is claimed that after three seconds running the fire box is well heated and that in six to eight seconds the intake manifold is sufficiently warm to maintain uniformity of mixture to the cylinders. The device is so well heated that kerosene can be used in cold weather as easily as under more favorable operating conditions. All of the air flows into the one opening at the side of the mixing chamber, this opening being so formed that a downward whirl or eddy is imparted to the air, which carries the kerosene from the spraying nozzle. Once through the bottom of chamber *C* this air laden with kerosene vapor and globules of liquid, divides, part of it going directly above the stand pipe and part going down into the fire box, the amount going into the fire box being a relatively small portion of the total. The air entering the fire box through *E* is relatively free of fuel, so it picks up the kerosene dripping from the distilling plate. The lighter kerosene particles are carried direct as indicated by the arrows, while the heavier fuel particles go into the fire box, and are gasified before passing to the engine. It is claimed that the temperature can be regulated by raising or lowering the distilling table for which an adjustment is provided, so that its relation to the fire screen may be varied. On checking the draft on the fuel and air the temperature will be reduced by allowing greater draft, the combustion will be more energetic and the temperature will be higher.

When first starting this carburetor all of the fuel passes through the fire box and as soon as the distilling table temperature increases the more volatile elements are distilled from the fuel and the vapor thus produced results in a resistance to the flow of other than the heaviest bodies through the holes in the fire screen and this produces an increase of temperature in the member. As soon as pipe *G* is also heated to a point where all the lighter particles of fuel are well vaporized the heavy residue flows into the fire box to be partially burned. Great flexibility is claimed for an engine equipped with this carburetor, as it is believed by its makers that the use of a fixed gas is of more value than the ordinary system of attempting to vaporize a mixture with heavy liquid particles in it by the ordinary hot plate or heated jacket manifold construction.—*Scientific American*, 17/11.

LARGEST MACHINE OF ITS TYPE.—A 200-ton floating crane, built by the Wellman, Seaver, Morgan Company, Cleveland, Ohio, for the Norfolk Navy Yard, and the largest machine of its type ever constructed in the



BROADSIDE VIEW OF CRANE, TOWER AND PONTOON WITH POWER PLANT.

United States, is shown herewith in one illustration. This crane is mounted on a pontoon 140 feet long, 85 feet wide and 15 feet deep; it has a lifting capacity of over 200 tons, a reach of $62\frac{1}{2}$ feet over the side of the boat, or a radius of 105 feet. The test load required by the navy, and which was handled successfully, was over 400,000 pounds. This crane resembles generally the ordinary revolving derrick in which the jib is rotated to the point opposite the weight to be lifted when it is lowered until the hooks hang above the object. The latter are then lowered or raised by means of steel cables passing over sheaves built into the end of the jib. The main hoist consists of two hooks fixed on the jib. When raised to its maximum height the latter is over 200 feet above water level, or it would tower over the roof of an eighteen-story building.

The crane rotates in a complete circle and this movement is controlled by two 60-horsepower motors. The boom luffs up and down from a practically vertical position to an angle of about 30 degrees in the horizontal in its lowest position and this movement is accomplished by two 10-inch screws, operated by two 60-horsepower motors.—*Marine Journal*, 26/1.

AIR PUMPS.—This rotary valveless air pump, designed to produce a high vacuum, consists of two main parts, the rotor and the drum, rotating

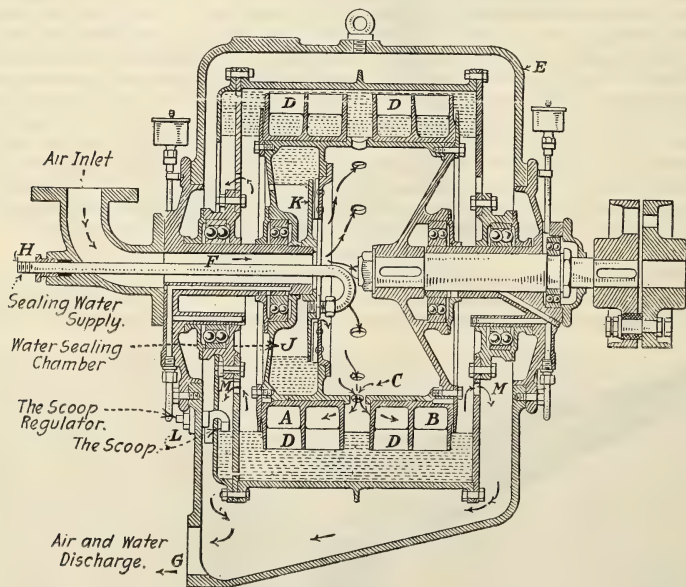


FIG. 1.—Globe-Johnston Rotary Vacuum Pump in Section.

on ball bearings in a specially designed casing. By a small modification the vacuum pump may be converted into an air compressor.

The rotor, Fig. 1, as applied for the vacuum pump, is a hollow member on the outer circumference of which deep double-thread screws are formed. A passage C runs between twin-screw threads A and B into the interior of the rotor. When the machine is producing a vacuum this passage acts as the inlet to the screw threads, but when air is being compressed it is

the outlet. Similarly, the pipe F running from the interior of the rotor to the exterior of the machine is the inlet pipe in the vacuum pump and the outlet pipe in the compressor. The screw threads are joined by a large number of narrow partitions or blades D which are equally spaced around the periphery of the rotor. The outer and inner edges of these blades are respectively flush with the top of the screw threads and half-way down the depth of the threads.

The ring of water is in the first place set up by the action of these blades in conjunction with centrifugal force. Annular rings E , called shrouding blades, fitted to the sides of the rotor and reaching somewhat below the water level on the discharge side, prevent the exhausted or compressed air from returning along the screws when the thread ends leave the water seal.

The rotating drum is a hollow cylinder also running on massive ball bearings. The drum when rotating contains the ring of water and is set eccentrically to the rotor. The relative eccentricity of the rotor and the water ring produces what is called the "working space."—*Engineering*, January.

INVENTOR OF NON-SINKABLE VESSELS EXPLAINS DEVICE.—*Buoyancy Boxes, Placed all Over Steamships, Will Render Ships Difficult Targets for Germans After They Are Equipped, Says William T. Donnelly.*—William T. Donnelly, naval consulting engineer, of New York, and a member of the Committee on Ship Protection of the United States Shipping Board, recently explained his invention for rendering cargo vessels non-sinkable. His work on the problem, he said, antedated the war by several years, and began when he found that a 20,000-ton non-sinkable dry dock he had arranged for the Grand Trunk Pacific Railroad proved a practical success.

Mr. Donnelly said that his patents for a non-sinkable ship, filed in the Patent Office, first directed attention to the invention, and that after careful study the Committee on Ship Protection submitted a report which General Goethals unqualifiedly approved. General Goethals, Mr. Donnelly said, also had recommended the application of the invention to the ships which the Emergency Fleet Corporation is building.

Generally speaking, Mr. Donnelly's scheme involves the use of "hull buoyancy boxes" and "cargo buoyancy boxes," the former supplying the necessary support for the ship itself, and the latter for the cargo. His description of his invention is as follows:

"The boxes are approximately 3 feet long and 2 feet wide by 1 foot thick, and are placed between the frames on the sides of the ship, between deck beams under all decks, and also against each side of all bulkheads. All boxes are carefully secured in place against movement from the rolling of the ship, and protected from the cargo by the usual cargo battens. The total number of hull buoyancy boxes on the *Lucia*, a ship of 10,000 tons dead weight capacity, was between 9000 and 10,000.

"Entirely independent of the hull boxes there are approximately 3000 cargo buoyancy boxes on the *Lucia*. This buoyancy is sufficient to support 8600 tons of coal when submerged in water, which was the amount of cargo that would load the *Lucia* down to her maximum draft line.

"The cargo boxes do not necessarily interfere with or reduce the amount of cargo carried, or only in an amount represented by the actual weight of the boxes. In other words, if the *Lucia* without the cargo boxes had been loaded with a cargo of coal down to her maximum draft line there would have been approximately one-third of her cargo space left empty, and it is this waste space that the boxes were devised to fill. It is further to be understood that these cargo boxes were so disposed as to protect the stability of the ship when water-logged, and also in those parts of the interior of the ship in which it would be more difficult to introduce and remove cargo.

"In case of other cargoes, the buoyancy boxes would be used in proportion to the weight to be sustained. In other words, the loading of the vessel to make it non-sinkable is an art to be developed with the thorough knowledge of the specific gravity of the cargo. In case of a cotton cargo, no cargo buoyancy boxes whatever would have to be used. My investigations show that the deduction in cargo space because of the buoyancy boxes will average between 10 and 20 per cent.

"The cost of the installing of the buoyancy and cargo boxes in the *Lucia* was less than 10 per cent of the value of the vessel.

"Regarding time of installation, the Ship Protection Committee now has before it an offer from a reliable concern to supply buoyancy boxes at the rate of 10,000 to 11,000 a day, and I believe that they can make a complete application to a ship of the same dimensions as the *Lucia* in from two to four weeks.

"The degree of safety achieved by these boxes can be judged from the fact that 12,000 boxes are distributed over the hull of a ship 400 feet in length, and that the largest breach of a torpedo does not exceed a hole 25 feet in diameter, which would probably destroy from 50 to 100 boxes. The margin of safety is such that from 80 to 100 feet of the side of the vessel could be destroyed without causing the ship to sink.—*N. Y. Herald*, 15/2.

AERONAUTICS

IS THE MONOPLANE COMING BACK AGAIN?—From France comes the report that the monoplane is again coming into favor in the French air service. The Morane parasol monoplane, in which the planes are placed some distance above the fuselage so as to give the pilot unhampered view, has been improved and is now being reintroduced. The Morane parasol was one of the three types of airplanes with which France entered the war, but after a few months of actual service it was dropped. In its present form this monoplane is said to be a wonderful climber and to possess a great speed.—*Scientific American* 2/2.

SMOKE CAMOUFLAGE FOR AIRPLANES.—It is reported that the Gotha airplanes which raid England from time to time, are equipped with apparatus for producing smoke clouds for purposes of concealment. The smoke cloud is usually emitted when the raiders are threatened by anti-aircraft artillery; and since it has the same color and formation as the fleecy clouds overhead, the task of the gunners below is made far more difficult.—*Scientific American*, 2/2.

FLIGHT (LONDON), DECEMBER 6, 1917.—*The Danger of Over-Standardization* (Editorial).—We are glad to hear that the Air Board has addressed a communication to the Aircraft Production Board of the United States on the subject of the danger arising out of over-standardization of aircraft, a subject to which attention has frequently been directed in these pages. As to the usefulness of standardization within limits there can be no two opinions, but it is quite possible for the keenness for output to work to our great disadvantage. In considering the problems attending the construction of aircraft, we have to keep it well before us that the design of to-day is likely to be rendered hopelessly obsolete by that of to-morrow, and it is thus folly of the worst description to put all our eggs into the one basket. We are not implying that that is the policy which is being pursued in America, but we do think there is a danger that our allies' enthusiasm for manufacturing efficiency and huge outputs might tend to lead them a little astray. Evidently this view is shared to some extent by our own authorities, and hence the warning which is said to have been given. No undue importance need be attached to the fact that the Air Board has thought it necessary to give America what may really be called a friendly tip. There is

certainly no divergence of opinion between us and our allies regarding the future of war in the air. All that has happened is that a little advice, born of our greater experience of war, has been tendered by the one and accepted by the other in the spirit of absolute friendship.—*Rudder*, 15/1.

MAKE COMPLETE LIBERTY ENGINES IN FORD PLANT.—All available parts of the Detroit plant of the Ford Motor Company not now engaged in government war work soon will be devoted to high speed production of Liberty motors for America's airplane fleets. The Detroit factory has been turning out cylinders and other engine parts for several months, but the new program disclosed to-day provides for wholesale production of the completed engines. Recent tests of the Liberty motor indicate that a minimum of 400 horsepower can be expected from the new engines.—*N. Y. Herald*, 13/2.

NEW PROPELLER SHAPING MACHINE.—"The Will to Win" has caused many ingenious machines to be designed for the purpose of speeding up the production of struts, propellers, and other pieces of airplane woodwork.

Extreme accuracy as to weight, balance and form is vital, and must be taken into consideration by the designer of any wood-working machine to make it a success on airplane parts. Especially is this true of the two-, three-, or four-blade air screws. For this reason many of the standard wood-working machines have proven altogether inadequate to these exacting needs.

One of the latest machines to be offered to the manufacturers of airplane woodwork is a special propeller shaping machine which will handle the three- or four-bladed screws, as well as the two-bladed ones. It is built by the C. Mattison Machine Works, Beloit, Wis.

The Mattison Company has thoroughly studied the requirements of a propeller lathe, and with the cooperation of some of the biggest manufacturers in the country has perfected a machine which bids fair to revolutionize the production of propellers, on account of greatly increasing capacity, as well as of much smoother cutting. This works so close to finished size that very little hand work is necessary after the machining operation. The manufacturer of this lathe will be pleased to supply to any one interested in the manufacture of propellers any detailed information regarding the construction and operation of the machine.—*Aviation*, 15/1.

AERONAUTICS (LONDON), NOVEMBER 21, 1917.—*A Zeppelin Surprise.* By Jhadoo Jahaz.—The writer examines the conditions which the Zeppelin airships had to fulfill, during their last raid on the British Isles, in order to reach the extraordinary altitude from which they delivered their attack.

For this purpose the author had at his disposal the following table of estimated weights of the Zeppelin L-49, which had been prepared by Mr. Warner Allen:

	Tons
Hull framework	12
Outer cover and gas bags	5
Planes	1
Framework of cars	1
Power plant	2½
Fuel tanks	1½
Armament, wireless	½
Miscellaneous	1
Total	24½

The gross lift of the modern Zeppelin being assumed as 60 tons, it follows that 35½ tons remain available for "disposable weights," such as crew,

fuel, bombs, and water ballast. Of this, $1\frac{1}{2}$ tons are taken up by the crew, $5\frac{1}{2}$ tons by the fuel supply, and $2\frac{1}{2}$ tons by the bombs, so that the Zeppelin must carry in the neighborhood of 26 tons of ballast. The latter amount the Zeppelin fully needs for attaining the 20,000-foot level, provided allowance is made for additional dynamic lift.

It will be seen that these figures closely tally with those computed in the December 15 issue of *Aviation and Aeronautical Engineering*, although there is necessarily a certain variance between the two estimates of weights of the structural parts of the Zeppelin.—*Aviation*, 1/1.

MILITARY AIRCRAFT AND THEIR ARMAMENT.—*Tactical Maneuvers and Developments That Have Resulted.*—By Jean Abel Lefranc.—The technical elements to be considered in aerial combat are based upon the qualities of the aeroplanes engaged, such as armament, speed, facility in handling, altitude capability, etc. These tactical and technical elements may be divided into two sorts, which though very different are intimately connected.

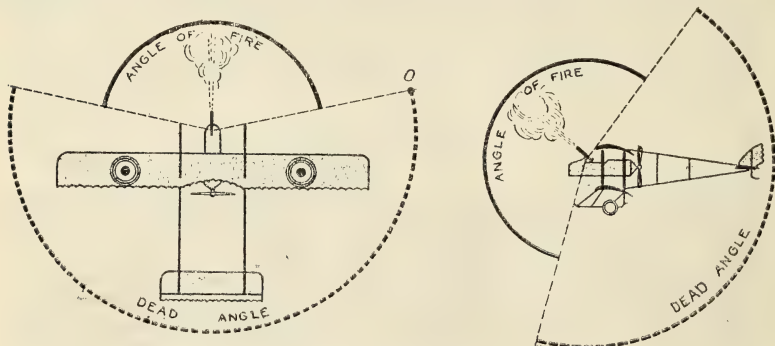


FIG. 1.—Firing Area and Obstructed Area of a 1915 Farman.

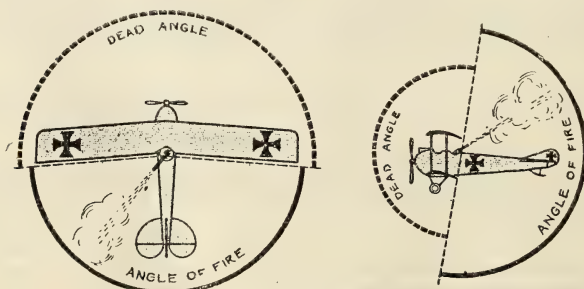


FIG. 2.—Firing Area and Obstructed Area of a 1915 Aviatik.

The combat begins by a series of tactical maneuvers by means of which the assailant seeks to get as many initial advantages on his own side as possible, by surprise, by a greater altitude, by a group attack, by a rear attack, etc. It is ended by the actual contest between the machines, continued till one side or the other is destroyed or put to flight.

It is evident that the preliminary tactics can be executed only if the technical qualities of the avion make them possible. Freedom to choose between engaging in combat or avoiding it implies superiority of speed.

If the machine possesses the four technical superiorities of the ideal airplane, speed, climbing, armament, ease of handling, then its pilot has all the tactical advantages on his side.

But an airplane may have a single one of these technical superiorities yet be unable to gain any tactical advantage therefrom. For example, the Voisin gun-airplane, with its 37-caliber rapid fire guns was superior in armament to most of the enemy airplanes of that period; but since it had no speed, was not easy to manage, and could not rise, in practice, above a height of 2500 meters (8125 feet), it was almost never able to profit by its advantage of armament. The enemy airplanes profited by their speed and

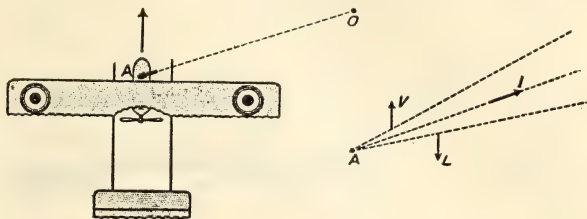


FIG. 3.—Deviation of Trajectories in Consequence of the Displacement of the Airplane.

facility of management to attack it without getting within its very limited range, their superiority in climbing enabling them to refuse combat by rising to a height of 5000 meters (16,250 feet). The technical elements are identical in all aeroplanes of the same type, but their employment in combat, *i. e.*, their tactical application varies with the ability of the individual pilot in each particular case. The utilization of the tactical elements is so dependent upon their intelligent application by the pilot that it often occurs that airplanes technically inferior in all points obtain tactical

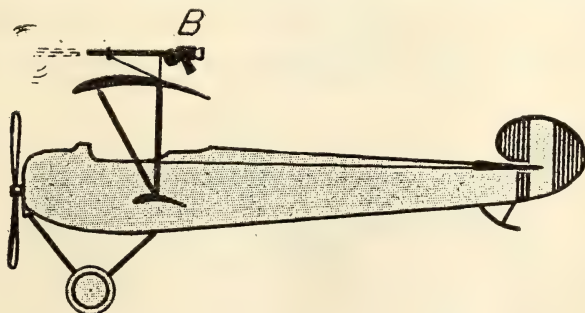


FIG. 4.—The Fixed Machine Gun of a Nieuport.

advantages by reason of the courage and skill of their pilots, and even absolute victories, over adversaries better armed, faster, and more easily handled, *e. g.*, the old Farman of 1915 over the Aviatiks of that year.

Our "Aces" in particular furnish an excellent example of good tactical handling of their machines. In general, however, it must be admitted that technical superiority is the surest method of achieving tactical superiority in the fight. Superiority of material equipment has been the chief basis of all German tactics in terrestrial combat.

The relative importance of each of the technical factors in air fighting varies according to the work required of the machine. For a fighting air-

plane the order of importance is as follows: speed, ease of handling, armament, and altitude. The German pilots who have been taken prisoner declare that the superiority of the Nieuport and the Spad over the "chaser" Albatross lies chiefly in their extreme ease of handling, the other factors being practically balanced.

Airplanes for artillery, photography, petty bombardment, or protection, which by reason of their specialization of function cannot be made fast enough to avoid combat, should be constructed with a view to technical

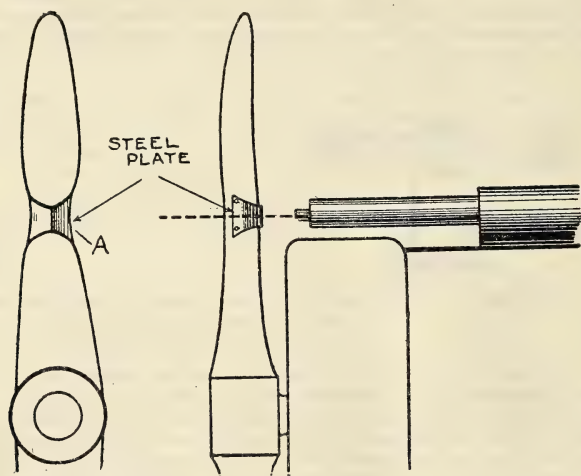


FIG. 5.—Garros Type Propeller for Firing Between the Blades.

superiority in defensive armament. Handling and speed are less important elements than for fighting machines.

The big airplane intended for bombardment by night demands entirely different technical qualities, such as capacity, radius of action, facility in landing, etc.

The present speed of French and German chasing airplanes varies between 180 and 200 kilometers per hour (110 to 123 miles per hour); it



FIG. 6.—Arrangement of Gun in 1915-16 Fokker.

might be much greater but for the fact that these machines are obliged to keep enough wing-area to enable them to raise their weight of a thousand kilograms (2200 pounds) to a height of 5000 or 6000 meters (roughly speaking, 16,000 to 20,000 feet), and to land on a chance terrain without being upset.

The present speed of airplane of artillery, photography, petty bombardment, and protection is from 125 to 150 kilometers per hour (cc. 75 to 90

miles), while that of airplanes for night use may easily remain as low as 90 to 120 km. per hour (cc. 50 to 65 miles), in case the exigencies of capacity demand it.

No limit is set to improvement in ease of handling, especially in machines specialized for combat. Knowledge of the formidable strains and pressures which come into play on surfaces of an extent of 25 square meters (the spread of the Albatross chaser) has arrived at such a point of precision that all sorts of aerial acrobatics are permissible, especially for chasing airplanes without any fear, normally, of ruptures or deformations.

If there are still numerous accidents due to ruptures they must be ascribed to inevitable imperfections caused by the necessity of producing large quantities of machines in a short time and of entrusting delicate bits of construction to mechanics too hastily trained.

Facility in maneuvering is a function of the judicious distribution of the strains to which the airplane is subjected; the ascensional strain, gravity, and the strains resulting from the use of the controls.

But after all the armament remains the decisive factor in the combat, for it is this which destroys the power of the enemy.

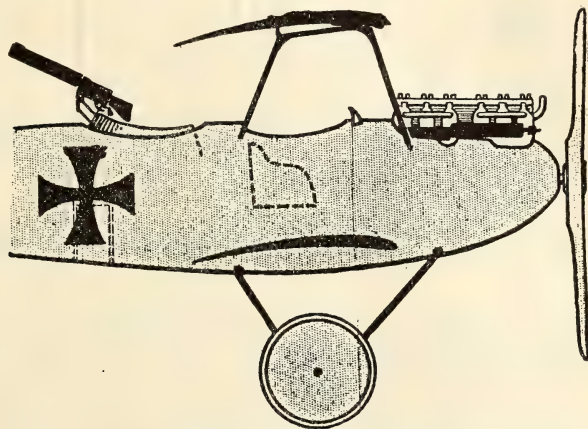


FIG. 7.—Position of Gun on 1917 Albatross.

I.—At the beginning of the war, when aviation had a relatively obscure rôle, and had not assumed the importance of a factor indispensable to victory, the necessity of the "mastery of the air" had not yet made itself felt, and aerial combat was a rare event. The airplanes went out armed with a carbine or rifle, and were generally careful to refrain from attacking. Then, little by little, each desiring to keep secret his own preparations, but seeking to know those of the enemy, combats became frequent. It became necessary hastily to mount machine guns with improvised supports which had to be perfected very rapidly. This was the first period of aerial combat, which had scarcely more than a single formula of armament. The airplanes, all two-seaters, were provided with a machine gun operated by the passenger.

The majority of the French airplanes, having the propeller at the rear, had behind them a considerably obstructed area or blind spot which favored surprise attacks. The machine gun, being generally placed on a pivot in the front of the nacelle, either to the right or to the left, made it difficult to defend the airplane on the sides (Fig. 1).

The German machines, having the propeller in front, had the machine gun at the rear. Their weapon was quickly mounted upon a pivoted turret which permitted it to be rapidly turned in order to fire to the right or the left. The obstructed area was in front and under the observation of the pilot (Fig. 2).

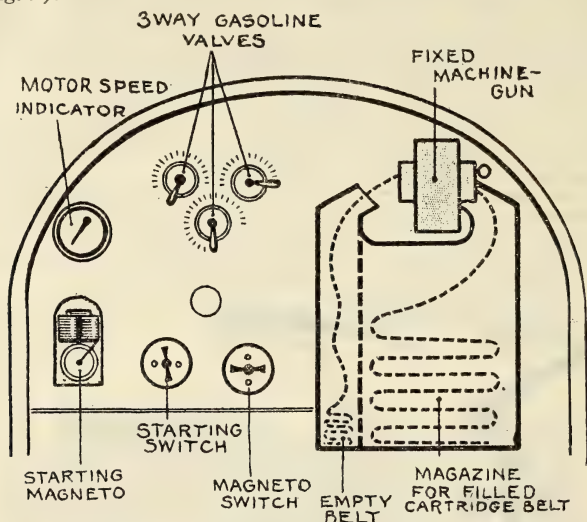


FIG. 8.—Position of the Fixed Machine Gun in the Fuselage (as Seen by the pilot).

It was quite surprising to observe how often furious combats at a short distance had no practical results except for a few balls in the wings. In the first place the munitions were limited. Either a few belts of 25 cartridges each or a drum of 100. The functioning of the machine guns was delicate, the supports not very practical, and the precision of the fire incredibly defective. The causes of this inaccuracy were many, proceeding

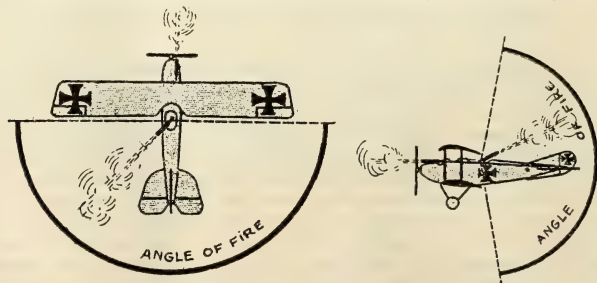


FIG. 9.—Firing Angle of 1917 Albatross C.

chiefly from errors of aim due to the relative speeds to the two combatants; but owing likewise to the very considerable vibration produced by these over-light machine guns, which prevented all accurate aim; also to the inconvenient positions the gunner was obliged to take in order to fire in the direction *O* as shown in Fig. 1; and finally to the difficulties in handling a heavy arm in a wind of 100 km. per hour (60 miles per hour).

Moreover, the trajectories of the shots fired, at the side, towards *O* (Fig. 3), were thrown out of line by new forces: the initial lateral speed, produced by the speed of the airplane (force *V* Fig. 3), the lateral wind pressure upon the projectile by this same speed (force *L* Fig. 3); two forces *V* and *L* which are compounded with the initial speed *I* of the ball and deform the trajectory.

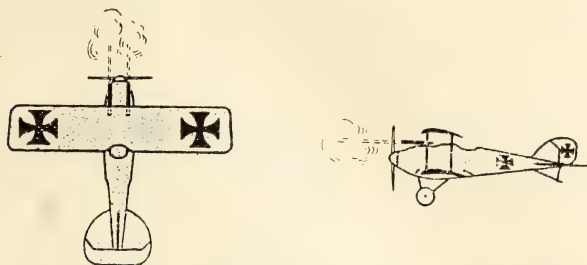


FIG. 10.—Firing of the Two Fixed Machine Guns in the Forward Part of 1917 Chasing Albatross.

The sight of the gun, moreover, ceases to give a precise indication for arms which fire almost vertically, above or below, and but rarely in a horizontal plane. The distance of the shots is generally less than 400 meters (1300 feet) and if we note this element of error it is merely to add it to the preceding causes to show the great difficulties involved in aerial firing.

II.—The second period comprises the organization of the armament on board airplanes of specialized missions. Three principal formulas have been adopted by our enemies as well as by us:

1. Firing forward by a fixed machine gun shooting above the propeller or through it (one-man machines).

2. Firing forward by fixed machine gun shooting like the preceding, but with the addition of a machine gun on a tourelle shooting towards the rear (two-seaters).

3. Firing forward by a machine gun on a tourelle, towards the rear by a machine gun on a tourelle, and under the fuselage with the gun on a pivot (three-seaters).

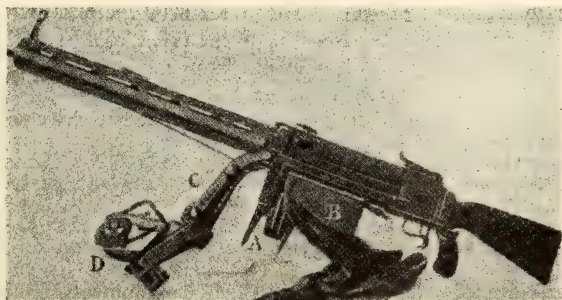


FIG. 11.—Parabellum Mitrailleuse Movable on a Tourelle.

A, lateral reel carrying a band of 250 cartridges; *B*, sack into which the shells are ejected; *C*, jointed fork; *D*, carriage revolving on the turret. Weight 12 kilograms (26 lbs.). With 250 cartridges and accessories 32 kg. (70.4 lbs.).

The constructors have been led to study the formula of fixed firing towards the front, either through the propeller or above it, in the first place to enable one man machines to become fighting machines, and next to avoid all the inconveniences indicated above in the case of movable guns on tourelles or pivots.

Evidently the first result of employing a fixed gun is to enable the pilot of a one-man machine to operate his own weapon. The gun fires in the axis of the airplane; the pilot aims at the object with his entire machine; the aim is accomplished by a sight strictly parallel to the gun. In the second place, since the gun is fixed and consequently forms a solid part of the whole mass of the airplane, all firing vibration is suppressed.

Other advantages result from this arrangement of the gun, the excellent position of the pilot gunner, no more deviation produced by lateral wind (force L Fig. 3) and by the initial speed of the airplane (force V); this force V is transformed into a supplement of the initial speed of the ball.

1. The first application of the fixed gun firing above the propeller dates from the appearance of the Nieuport chasing biplanes (Fig. 4). This machine gun was placed above the top plane, and fired above the propeller. The principal inconvenience of this position, outside the great resistance to forward movement, was the difficulty of loading the arm. To reload the gun the pilot turned it upside down in *B*, and was then able to remove the discharged disk and replace it with a new one containing 47 cartridges. These 47 shells were quickly fired at the rate of three or four hundred per minute.

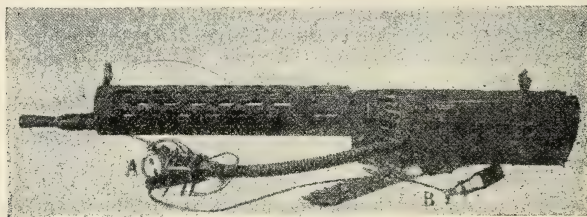


FIG. 12.—Fixed Maxim Machine Guns.

A, arrangement for synchronizing from the motor; *B*, grip of bowden control governing the fire. Weight 13.3 kilograms (29.26 pounds). With 500 cartridges and support 36 kg. (79.2 lbs.).

It is easy to fancy the difficulties encountered by the pilot, who not only had to drive his machine, but fire and reload his weapon. In fact, if the pilots of our first Nieuports did not obtain a decisive result with the first disk, they were obliged to stop fighting. The second application of the fixed machine gun was the shooting through the propeller, first practiced by Garros. At first thought the principle of this seems extremely curious. The gun was fired in the normal manner. To keep the balls from striking and breaking the blades of the propeller two plates of extremely hard steel were fitted onto the blades at the point where the balls passed (Fig. 5). The balls which hit these plates were deflected and lost, but the others passed between the blades and continued their course towards the objective. The percentage of balls lost was negligible, being less than seven or eight per cent.

But a latent defect soon brought about the abandonment of this arrangement; this was a loss of speed on the part of the airplane of 20 km. per hour (65,000 feet or over 12 miles). As a result of its transformation the propeller lost a part of its tractive force, a reduced efficiency resulting from the tapering at *A*, a reduction of the pitch of the propeller being made to compensate the resistance of the steel plates, and thus maintain the motor in its normal action (Fig. 5).

This technical superiority of armament could not compensate in a chasing airplane for the tactical inferiority proceeding from a lack of speed.

The third application of this formula was invented by the Germans at the time their Fokker chasing single-seater appeared (Fig. 6). The fixed

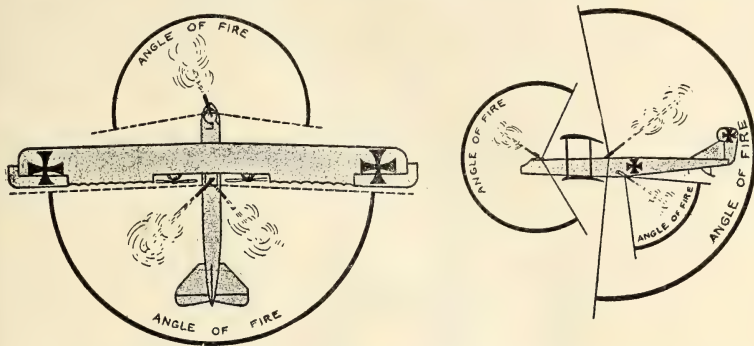
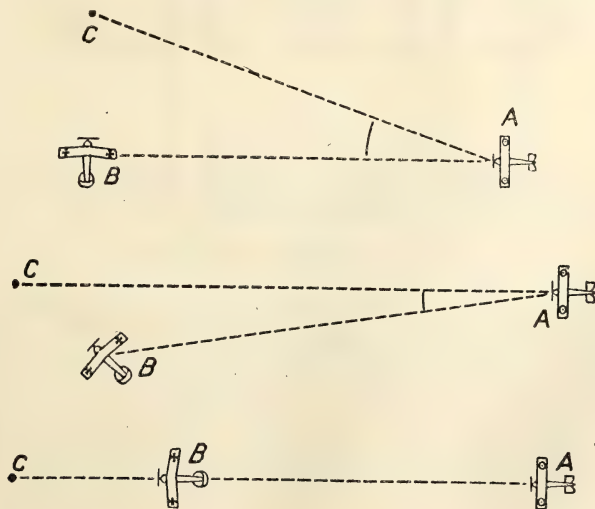


FIG. 13.—The Position of the Machine Guns, the Zones Under Fire with the 1916-1917 Gotha.

machine gun fires through the propeller, but it is governed by the motor, its action being synchronous with that of the motor. The propeller making 1400 revolutions per minute, and having two blades, it is obvious that the barrel of the gun is crossed by the blades 2800 times per minute, hence the



FIGS. 14, 15, 16.—The Direction of the Fire, Taking Into Account the Relative Displacement of the Enemy.

regulation of the firing must be sufficiently precise to permit the balls to pass in these intervals (a 46th of a second).

The control of the machine gun by the motor is effected by suitable gearing (Fokker, Albatross, D. Halberstadt, etc.), or by flexible transmis-

sion (Albatross, C. Rumpler C). The pilot operates his weapon at will by pressing on the grip of a Bowden control.

This application of firing through the propeller by synchronization of the machine gun with the motor is the arrangement adopted on the majority of airplanes, whether belonging to the French, the allies, or the enemy. The gun as sheltered under the hood of the motor (Fig. 7), its feeding is easy, and likewise clearing it of empty magazines. The cartridge boxes (Fig. 8) are capable of holding belts of 800 to 1000 cartridges per weapon.

The chasing airplanes are usually one man machines, it being found preferable to omit the observer to obtain a machine which is speedier, easier handled and capable of going higher and farther.

The German series of Albatross D I, D III, Halberstadt Roland D, Ago D, Fokker D, have two fixed machine guns firing through the propeller, and each provided with 1000 cartridges (Fig. 10).

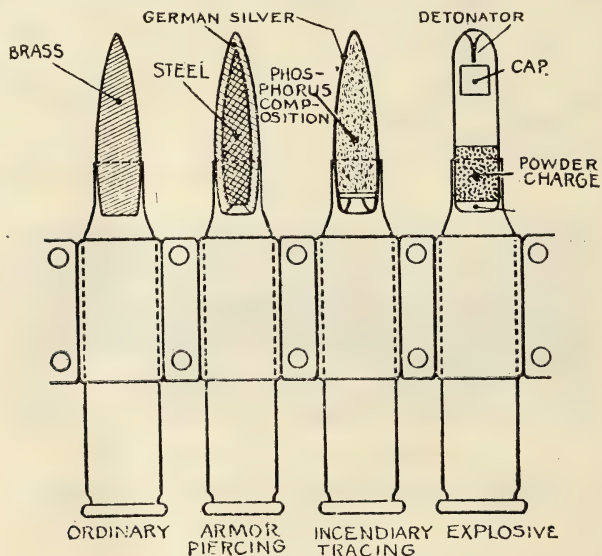


FIG. 17.—German Ammunition.

2. Another formula of armament (Fig. 9) exists for less rapid two-man airplanes, charged with the mission of directing artillery fire, taking photographs, or making petty bombardments. This series corresponds to the Albatross, Rumpler, Aviatik, L. V. G., the whole series of C, two-seaters, flying only from 140 to 160 km. per hour (cc. 85 to 97 miles).

Their armament is defensive; a forward machine gun fires through the propeller, this being of special service when the defence of these machines requires them to attack, and a rear machine gun is mounted on a tourelle. We have likewise adopted the same arrangements for our airplanes of equivalent series.—*La Nature* (Paris), *Scientific American*, 8/12.

SUBMARINES

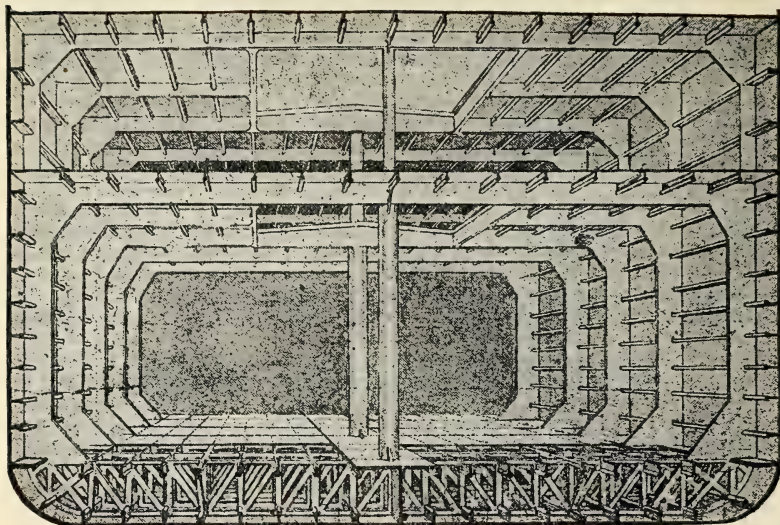
The Shipping Council of Great Britain is now considering a plan for the building of a number of towed submersible cargo carriers, which is backed by Prof. Vernon Boys, Prof. Hele-Shaw, and several leading shipbuilding firms and shipowners. The main idea is to have submarine cargo boats

that will be towed by tugs with their steam engines converted to the use of liquid fuel. That will avoid smoke, which indicates their presence to the enemy. They will be low-lying tugs, with not much top hamper, and will be armed and fitted with wireless. When a U-boat appears the tug would instantly slip its cable while the submarine cargo boat would sink to a depth already arranged. The tug would then be free to do its best, either to escape or to fight the enemy submarine with its own guns. The U-boat would probably know the tug had been towing a submarine cargo vessel, but would not know at what depth it was, or what had been its distance from the tug. Her torpedoes may have been set to 8 or 10 ft., so that her firing would be absolutely blind. But in the meantime the tug would have sent out a wireless message saying where she had dropped her cargo vessel. The message would be picked up by the nearest destroyer or aeroplane station, and help would soon be on the way. With regard to the cargo vessel itself, the inventors have taken out seven patents, the most important being one of Professor Boys, which regulates automatically the stabilizing of the submerged vessel at any pre-arranged depth. By another patent, after a certain number of prearranged hours two buoys will be released from the submarine cargo boat. One will be attached to the end of the cable that was dropped by the tug and the other will be attached to the boat itself. These buoys will show strong lights at night, so that after, say, 10 hours these buoys will indicate to the destroyers or aeroplanes the position of the dropped vessel. As the cargo boat will be much heavier than the U-boat, if the latter tries to search below the water for it the danger of a collision would be much greater to the enemy than to the submerged vessel. If the U-boat comes to the surface and tries to drag for it, that would be a long and tedious operation, during the course of which the enemy would probably be caught by destroyers or in danger of being spotted by aircraft carrying high explosive bombs. Some of the advantages claimed for the submarine cargo boats are its extreme simplicity and cheapness of construction, and the rapidity with which they can be turned out. Several shipbuilding firms have examined the matter, and have stated their readiness to at once start building directly government permission is obtained.—*Shipping*, 26/1.

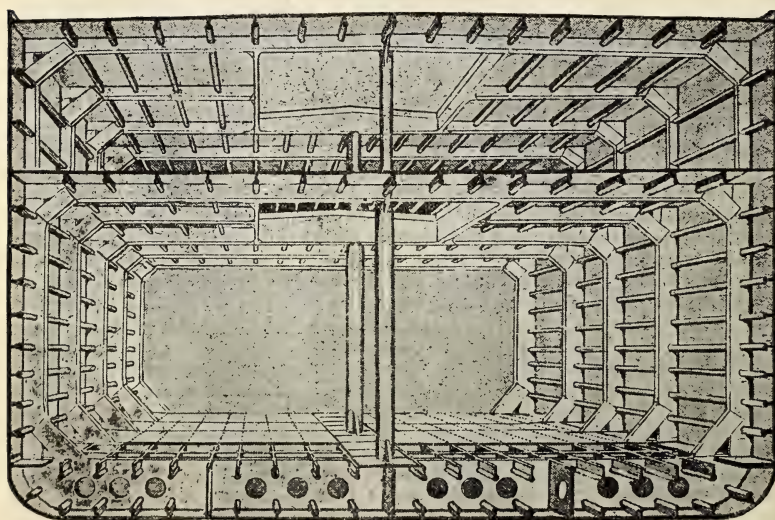
MERCHANT MARINE

CAST STEEL SHIP CONSTRUCTION.—By Mr. Myron F. Hill.—The demand for ocean tonnage is such that it calls for the most active co-operation of shipbuilders and of labor. Though the program of the Emergency Fleet Corporation may seem large, it is small in comparison with existing transportation requirements, and the continuous shrinkage taking place in the world's tonnage through submarine sinkings and through ordinary marine casualties. The great question before the country to-day is production or output of tonnage, which is being limited by the lack of skilled labor. As one means of overcoming this labor difficulty the cast steel ship has been designed. This type of vessel will be constructed by the Cast Steel Ship Company, and plans for suitable foundry plant and equipment are now being made. The cast steel ship will be cast in sections and welded together by the Wilson method of welding. This method of welding has been thoroughly tested, being the method used in the repairing of the recently owned German merchant vessels now in service under our flag.

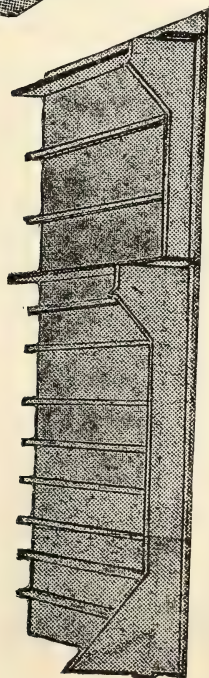
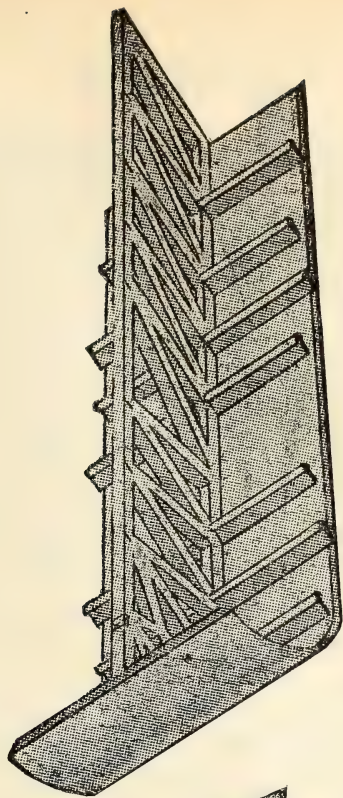
The welding of sections together will eliminate rivets, brackets, angles, straps, laps, and other connection metal forming 10 to 20 per cent of the steel used in a ship. Part of this metal is transferred to the cast sections to make them thick enough for casting for the thinner portions of the ship. Welded joints are planned for strength, and will be 50 per cent greater than plates to provide safety at joints. These joints, free from molecular action due to the mass strength of welded metal, will have approximately



SECTIONAL VIEW OF CAST STEEL SHIP.



SECTIONAL VIEW OF WELDED STEEL SHIP.



CAST STEEL SHIP SECTIONS TO BE WELDED INTO SHIP.

a tensile strength of from 62,000 to 64,000 pounds per square inch. Welding with an arc of fixed heat and speed insures the perfect adhesion of welding to castings. By welding automatically, a ship can be sectionally welded every week under expert supervision by using electrical equipment and by having unskilled labor feed the welding wire. With a regular yard crane outfit a ship can be assembled, and within a week be made ready for installation of engines and equipment. The inner bottom and decks and bulkheads of rolled steel are welded to framework and to the cast steel shell.

The Cast Steel Ship Company will operate on the division of labor principle. Under competent supervision gangs will operate through the shops, making mould after mould with proper devices. On completion of mould forms, pouring will be performed by liquid metal being conveyed on modern travelling cranes over forms and run. Moulds will then stand 24 hours, gates and risers knocked off, and castings extracted and cleaned. On account of variations in shrinkage, castings will thereafter be assorted, the largest castings being placed in the middle and tapered off to fit. The sections will then be electrically welded.

The Isherwood system of vessel construction proves ideal for casting. Ribs in two directions keep the castings free from buckling in handling. Castings provide overhanging ribs and lugs upon shell and framework, where the edges meet, so that castings when placed are forced together, bringing shell and overhang into position.

No scaffolding is necessary when castings are located, the automatic welders being set to work under the supervision of a few skilled practical men.

The Cast Steel Ship Company's program depends upon new foundry equipment, as open-hearth furnaces are used for treating the pig. It will take a gang of workmen about six weeks to construct one furnace. Three mould outfits will supply castings for practically half of a ship's length. The bow and stern sections will be cast from separate moulds. It is estimated that with proper furnace and mould equipment, about 500,000 tons of ship shells or hulls can be cast per month with 10 ways for assembling and launching.

The drawings shown herewith indicate what the company contemplates doing, although the final forms are not given. The final forms contain features which will be published later. The plans of the cast steel ship have been reviewed by leading naval architects of this country who have warmly congratulated the designer on his plans. The success of the cast steel ship has been made possible through the development of the welding system which enables joints, as stated, to be made stronger than the shell itself at a minimum amount of labor and by the improvements made in the art of casting steel. These are due to the encouragement afforded by the railroads where cast steel is rapidly supplanting riveted structures, as it has proven more durable and reliable, and reduces the cost of maintenance.

The cast steel ship has a smooth hull, which helps to increase its speed, and is lighter than the riveted ship, so that its cargo capacity is augmented and its speed again aided. It is from 10 to 25 per cent stronger than a riveted ship in its different parts, and is correspondingly more durable. The cost of building hulls by this process, when done on a sufficiently large scale with machine moulding processes, is considerably reduced.

The two great factors of value are the celerity with which vessels can be built and the small amount of labor—particularly of skilled labor—required to complete ships.—*Nautical Gazette*, 7/2.

THE CONCRETE SHIP.—The success of the concrete ship must result from slow development. Rear Admiral D. W. Taylor, chief of the Bureau of Construction and Repair of the Navy Department, on January 21 before the House Naval Committee was asked concerning experiments with a non-sinkable concrete ship suggested by Maxim. He replied that several different devices had been submitted by Mr. Maxim, and certain tests and experi-

ments had been made which, he thought, were satisfactory to him. He further said:

"The question of the concrete-ship protection, when it first came to us, did not come from Mr. Maxim. Certain people abroad have given a great deal of investigation to it, and a great many investigations and experiments have been made, and we know their results. I do not believe that any experiment that we would make would add very much to the information, although not familiar at the moment with Mr. Maxim's last development of the concrete ship. He started out with an entirely different device, not involving concrete, which we tested on a small scale. On one plan of using concrete to protect merchant ships it is associated with building an extension or bay window on each side of the ship—a blister, the technical English name is. That was suggested a number of years ago, and some ships have had these blisters applied, and in addition we have found that if you put a foot or two of concrete on the original hull of the ship—the blister projects practically 10 feet out from the original hull—it is effective in preventing the explosion reaching the interior of the ship proper. The real difficulty with all these devices—there are any number of devices which can be applied to add to the protection of merchant ships—but the real difficulty in the case of this blister, for instance, is that it would not only reduce the speed materially, but it would require perhaps 20 per cent of the material of the original hull, and the effort to apply it to the merchant ship would be, say, 20 per cent of the effort involved in originally building the ship. . . . Whenever these concrete people come to me I ask them: 'How does the weight of your ship compare with the weight on the ordinary system?' I have seen none who have looked into it carefully who will claim that a concrete ship will not weigh 15 or 20 per cent more than the ordinary type of vessel, and I have not seen any inventor who believes that the concrete ship can be built as light as the steel ship. There have been some small concrete ships built in Norway and an 80-foot tug. There is an enterprise on the Pacific coast, I believe, which is undertaking to build 5000-ton vessels of concrete, and there are various other people undertaking to build concrete ships. . . . I feel if the concrete ship comes, it will have to come just as the iron ship came and the steel ship. The steel ships have been built by trying them out until we know pretty well now what we can do in strength of steel ships. It has never been just exactly determined, as in building a bridge, where you know what will be upon it. I believe the concrete ship will come, if it does come, step by step, advancing, say, from 80 to 120 feet and from that to 150, and so on. . . . There is another factor in the concrete ship. Concrete has behaved very badly in a number of cases in sea water. The technical press has just been running a series of articles by a man from the Bureau of Standards, going particularly into the question of damage to reinforced concrete in sea water. We have had some troubles in the navy, at Boston particularly, with some piers we have built there."—*Army and Navy Register*, 2/2.

BRITISH EXPERIENCE WITH CORRUGATED STEEL SHIPS.—Consul General Skinner at London reports:

Considerable interest has been created in Great Britain in consequence of the recent public statement of Mr. Axel F. Ericsson, Chairman of the Ericsson Shipping Company and the Monitor Shipping Corporation, setting up the claim that the corrugated ships recently built by his concerns have proved to be extraordinarily successful in every respect.

The corrugated steel ship is produced from patented designs and is distinguished mainly by the fact that the necessary strength is obtained by deep corrugations instead of a structural framework.—*Official Bulletin*, 9/1.

FIRST GERMAN CONCRETE STEAMSHIP COMPLETED.—The first German freight motor vessel to be built entirely of reinforced concrete has just completed its trial trips at Hamburg. According to the *Fremdenblatt* it is

made of "a new kind of concrete which weighs only half as much as gravel concrete." The newspaper expresses the opinion that an epoch-making innovation in ship construction has been made by this new German invention, "which has a great future in the building of river boats, sea boats and large ships."—*N. Y. Herald*, 14/2.

"TORPEDO-PROOF" VESSEL PROPOSED BY HUDSON MAXIM.—Hudson Maxim, inventor, outlined to the Senate Ship Investigating Committee a scheme for ship construction which he said would minimize the effect on merchant vessels of explosion of torpedoes, by instantly disintegrating through a cooling process the gases formed by the explosions. He said he had sought in vain to interest the Emergency Fleet Corporation in his proposal and that he came to the committee in the hope that the government would conduct experiments to determine its worth.

His scheme, the inventor said, was to line the inside of the hulls of vessels with cylinders containing water with a steel screen behind them. When the torpedo exploded, the water tanks, he said, would be hurled against the screen, atomizing the water, which would disperse the heat and absorb the gases. A cargo such as apples, potatoes and similar produce containing a large percentage of water would serve just as effectively as the tanks, he said.

Mr. Maxim declared that the Ship Protection Executive Committee had made an "irrelevant and untrue" report on his scheme, asserting that it would be expensive and ineffective on vessels of less than 10,000 tons. He denied that the scheme would be costly and said it would operate on vessels of 3000 or 5000 tons practically as well as on larger vessels.

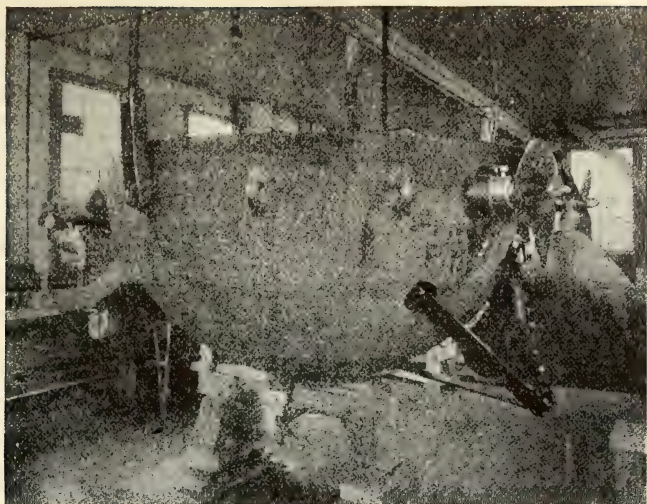
Concrete ships, the inventor said, offer a greater advantage in combating the submarine menace than steel or wooden vessels, as they give greater resistance and absorb heat better. A concrete hull, he said, would localize an explosion, and he strongly urged construction of concrete skins for steel vessels.

He said the nations fighting Germany either must stop the submarines from leaving their bases or build torpedo-proof vessels, as he did not think they should attempt to offset the submarine campaign by building new vessels.—*N. Y. Herald*, 17/1.

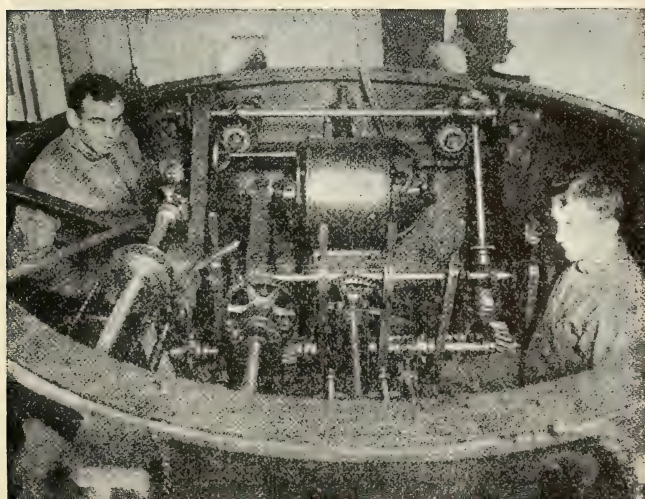
MISCELLANEOUS NOTES

DEEP SEA DIVING MACHINE PROGRESS.—Aside from other considerations, it is but natural to expect that the war with its attendant submarine and kindred activities has drawn attention to the hitherto limited scope of salvage operations where deep water sinkings are concerned, and has turned men's thoughts to the devising of means whereby present and past difficulties may be overcome and the sea be forced to yield back a moiety at least of the vessel treasure which is so ruthlessly, unceremoniously and continuously being committed to its keeping. Irrespective of the wonderful strides that have been made in the arts, crafts and manufactures during the past half century or less, it is a remarkable fact that in operations beneath the surface of the water, little progress is to be recorded. Vessels valuable in themselves and equally so as regards their cargoes strew the beds of the world's seas and of the Great Lakes of the North American continent.

The method of raising ships employed to-day is familiar to most people, and it has been long enough operative to make them assume, if not believe, that it is the one and only way. In essence, it consists of a diver equipped with a rubber diving suit, copper helmet, and heavy leaden-soled shoes. Such an equipment makes it practically impossible for the man to work efficiently even in shallow water. Again, in depths greater than 300 feet the water pressure makes it impossible even for an individual of exceptional physique to do work of any kind.



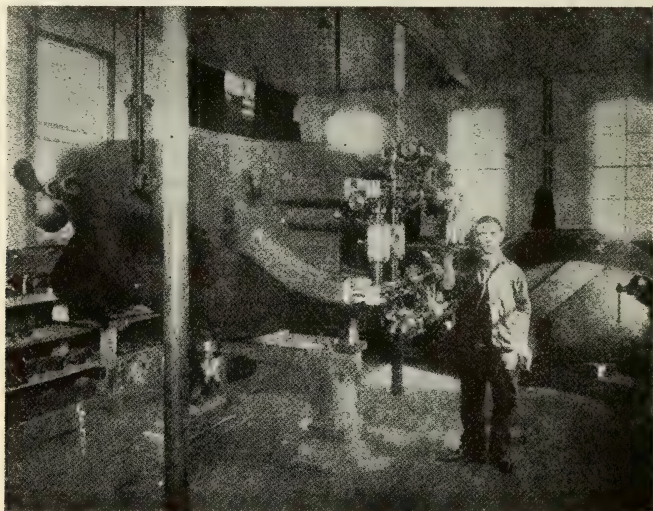
REAR VIEW OF LOWER HALF OF DIVING MACHINE.



INTERIOR VIEW OF LOWER HALF OF DIVING MACHINE.

Spasmodic attempts have, of course, been made by inventors, scientists and engineers to overcome the inefficiency noted, but the limited nature of the sphere of application and the problematical value of the monetary returns, have contributed materially to restrict and confine effort to the preparation of nothing more tangible than designs and the filing of patents. Times have changed, however, as a result of enemy submarine activity; in a word, the old adage that "It's an ill wind that blows nobody good," is in process of being demonstrated, hence the appearance on the horizon of practicability, for the recovery of sunken ships, and such cargoes as are not destroyed by the action of sea water, as well as bullion, of the Sisson Deep Sea Diving Machine, by which name the apparatus is known.

The Sisson Deep Sea Diving Machine has been designed by W. D. Sisson of Alpena, Mich., and 115 Broadway, New York City, and consists of a hollow iron sphere 90 inches in diameter, within which are installed the necessary pumps, propellers and drills, the latter to perforate the sides of



SIDE VIEW OF LOWER HALF OF DIVING MACHINE SHOWING HULL DRILLING MECHANISM.

ships' hulls. There are also embraced a thrust arm with which to insert lifting hooks into the drilled holes and four electro magnets of some $2\frac{1}{2}$ tons holding capacity, arranged to operate in pairs. The electro-magnet control admits of the diving machine creeping along the sides of a vessel to any desired location. An electric motor operates the various pumps, propellers, drills, etc.

The air supply system is arranged more or less on the lines adopted in submarines, an air tank being installed in the apparatus of two-men-supply capacity. Two propellers in the rear and bottom of the machine give navigation direction at will. Light is furnished by six 3000-candle power nitrogen lamps. Electric current and telephone communication are furnished by a cable between the tender and the machine. The pontoons employed as adjuncts are of corrugated steel, about 15 feet in diameter by 40 feet long.

Circumstances and location will, of course, determine many details of application and of the device in practice. In general, however, it may be

said that having ascertained the approximate location of a sunken vessel, the machine is lowered overboard from the tender, following which, by means of its propellers, search is made in the immediate vicinity for the exact position of the wreck and determination of its physical status. These preliminary problems having been satisfactorily solved, the pontoons are next lowered into position. Drilling of the hull for holes in which to insert the lifting-hooks is the next operation. The pontoon number and capacity will vary with the weight and dimensions of the vessel to be raised. However, it is hardly possible to imagine a case of possible salvage where the requisite pontoon number and capacity would be inapplicable. It should be stated here that the pontoons are water-filled when being submerged, the water being emptied out by internally-contained motor pumps when the actual raising is in process.

One diving unit is reported to be some 95 per cent complete at the company's shops and arrangements are in progress with a view to having it employed for the recovery of sunken vessels this coming spring. The views accompanying this article and the data given above have been supplied by the American Salvage Co., 115 Broadway, New York.—*Shipping*, 2/2.

CURRENT NAVAL AND PROFESSIONAL PAPERS

UNITED STATES

CURRENT HISTORY. February.—The Month's Submarine Warfare.

REVIEW OF REVIEWS. February.—Sea Power Our Foremost Need, by *Albert Shaw*. Submarines and Coal, by *Harrington Emerson*. Germany's Second Peace Offensive, by *Frank H. Symonds*.

WORLD'S WORK. February.—How Germany is Preparing for the Next War, by *J. B. Gardiner*. Germany's Plots Exposed, by *John R. Rathorn*, editor of *Providence Journal*. A National Harbor for the Fleets of the Sea and Air (New York), by *Lindon W. Bates*.

OUTLOOK. February 13.—Warships and International Friendship (Visit of U. S. Fleet to South America), by *Samuel J. Inman*.

NAVY AND MERCHANT MARINE. January.—Influence of the Submarine on the War, by *Marley S. Hay*.

AVIATION. January.—Seaplane Float Construction, by *Charles G. MacGregor*.

JOURNAL OF FRANKLIN INSTITUTE. January.—America's Air Service, by *W. F. Durand*, Chairman, Nat. Comm. for Aeronautics.

GREAT BRITAIN

CONTEMPORARY REVIEW. January.—Lord Lansdowne and the League of Nations, by *Lord Parmoor*. The Entente and the Allies of Germany, by *Noel Buxton, M. P.*

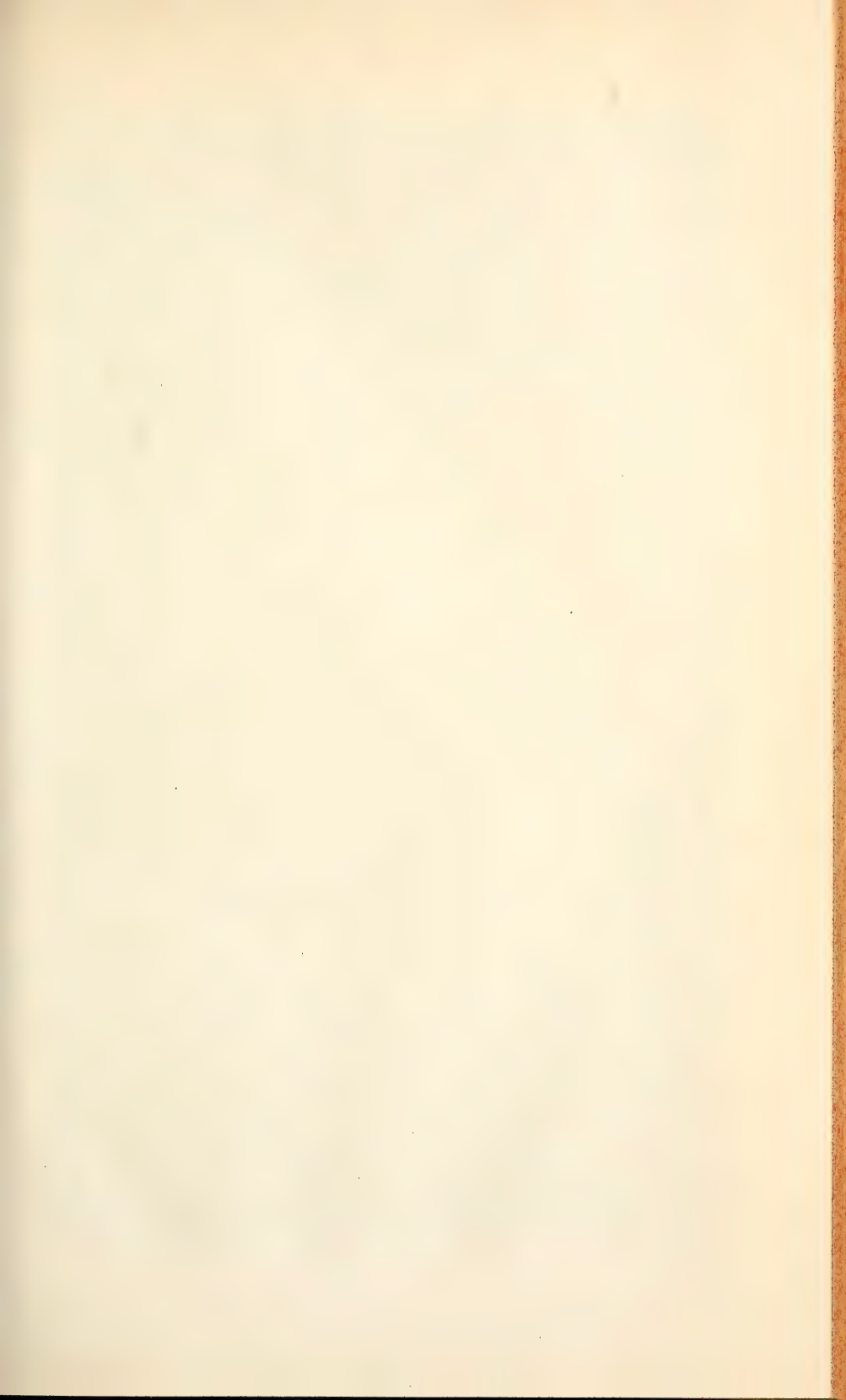
NINETEENTH CENTURY AND AFTER. January.—The British Constitution and the Conduct of War, by *Prof. Spenser Wilkinson*. The Freedom of the Seas, by *John Leyland*.

FORTNIGHTLY REVIEW. January.—Aerial Warfare, 1918, by *Claude Grahame-White* and *Harry Harper*. America's Weapon for Peace, by *J. D. Whelpley*.

GEOGRAPHICAL JOURNAL (LONDON). January.—Geographical War Problems in the Near East, by *Col. Sir Thomas Holdich*.

UNITED SERVICE MAGAZINE. January.—The Navy and the War.







SAND BAGS PROTECT ALL VULNERABLE PARTS OF FIGHTING SHIP.

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NAVAL WAR NOTES

PREPARED BY

LIEUTENANT W. B. JUPP, U. S. Navy

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STRATEGY

ALLIES AND U. S. BEGIN SUPREME WAR COUNCIL.—Great Britain, France, Italy and the United States were represented at the session of the supreme war council which was convened at Versailles, France, January 29, presided over by Georges Clemenceau, the French premier.

The meeting is regarded as one of extraordinary importance, because the plan of operations during the coming campaign is expected to come before it for determination.

The United States was represented by General Tasker H. Bliss, Chief of Staff of the American Army. Arthur Hugh Frazier, Secretary of the American Embassy at Paris, attended as a diplomatic officer, to report the proceedings, but not to participate otherwise. The other participants in the conference were:

For Great Britain: Premier Lloyd George and Major General Sir Henry Hughes Wilson, subchief of the British General Staff; for Italy: Premier Orlando, Baron Sonnino, the foreign minister, and General Cadorna; for France: Stephen Pichon, the foreign minister; General Ferdinand Foch, Chief of Staff of the Ministry of War, and General Maximo Weygand.—*Evening Star*, 29/1.

SHIPS POOLED TO HASTEN AID TO ALLIES.—*American, Allied, and Neutral Vessels Under Board of Three*.—Centralized control of transatlantic shipping was established recently with the creation of a Ship Control Committee to have supreme charge of the operation of all ships—American, allied and neutral—entering and leaving American ports.

The committee was named by representatives of the Shipping Board, the War and Navy Departments, the Food and Fuel Administrations, the Director-General of Railroads, the British Government and ship-owners, who met to devise some plan for speeding up the movement of supplies to Europe. It comprises P. A. S. Franklin, of the International Mercantile Marine, chairman; H. H. Raymond, head of the Clyde and Mallory Lines, and recently made Shipping Controller at New York, and Sir Connop Guthrie, director of British shipping in this country.

The arrangement, as explained by Shipping Board officials, in effect creates a pool of ships moving supplies to Europe. Goods destined for overseas will be loaded in available ships, whether operated by the United States or the allies. With the aid of the Railroad Administration the committee will divert to southern ports much of the supplies that heretofore have clogged the port of New York, and incoming vessels will be directed by wireless to proceed to the ports in which materials of the most importance await shipment.

The plan yet has to be approved by the British Government and by the other allies, but officials have received the assurance of Sir Connop Guthrie and Sir Richard Crawford, of the British Embassy, that this would be forthcoming.

Approval of the neutrals is not necessary, inasmuch as neutral ships operated by the United States and the Allies are operated under charter. The British long have urged an arrangement of the kind, and months ago sought to have the United States enter the inter-allied chartering conference. The centralized control now authorized virtually creates such a conference on this side of the water.

Shipping experts here have expressed the belief that at least 30 and perhaps 50 per cent greater efficiency could be obtained from the shipping at the disposal of the United States and its allies by close coordination of effort. Great Britain's shipping, it was stated, represented about 80 per cent of the overseas service.

In a general way, the British Government's shipping will be used to carry foods in quantities sufficient to meet the emergency conditions abroad. The United States will endeavor to get the men across and supply to them the necessary arms and ammunition.

The direction of all this tonnage, American and allied, will come under the jurisdiction of the council of which Mr. Franklin is the head. The War and Navy Departments and the Food and Railroad Administrations will not have representatives on the council, as it is intended to concentrate power for action in a small body. Agents of these departments, however, will work in the closest cooperation.

There will be representatives of the new council in all of the important American ports, and agents will be sent also to France, England, and Italy. By the use of the cables the men at the helm here will be kept in constant touch with all developments.

One of the first problems to be taken up will be quick routing of vessels, which often have been delayed for many days because of a division of power in their direction. Arrangements will be made so that ships will know in advance and definitely the place where the convoys are to meet them and the time they are expected to be on hand. Orders in this connection will be applied to American and allied ships and will be mandatory. It is said that there has been much confusion and delay in the past.

Incoming ships will be informed in advance also of the ports at which they are to land, thus doing away with the delays which have been caused by vessels arriving at docks already overworked. Outgoing vessels will be instructed where to get their bunker coal and cargoes.

Where it is found essential cargoes of foodstuffs may be sent over the transportation lines of the nation to southern instead of northern ports, and ships receiving directions from the new council will call at such ports when instructed, even if the overseas course thus allotted to them may be longer. The shipmaster will have no right to use his discretion in such matters under the proposed system of control.

In fact, it is intended to give to the Shipping Control Committee practically absolute power over the employment of tonnage, with the single proviso that there will be no effort in the direction of fixing rates for the allied as well as the American tonnage.

Activities will not be restricted to this side of the Atlantic, as much work will be done in the development of port facilities in Great Britain and France to provide for the rapid unloading and loading of vessels.

Mr. Franklin will spend most of his time in Washington and will keep in close touch with Edward F. Carry, director of operations of the Shipping Board and the various departments involved. Mr. Raymond will establish headquarters in this city.

Raymond B. Stevens, vice-chairman of the Shipping Board, and George Rublee, of the board's legal staff, are to be sent to London as permanent representatives of the Shipping Board.

Mr. Stevens will take his place on the Inter-Allied Chartering Executive, which sits at London and Paris and has control over all British, French, Italian and neutral tonnage operating under charter to the Allies.

The Shipping Board is understood to have under consideration several shipping men for the posts of representatives of the Division of Operations at London, Paris, and Rome.

Robert P. Bass, former governor of New Hampshire, and a labor expert, who has been assisting Mr. Stevens in dealing with labor problems, will take over such of the vice-chairman's duties as have to do with labor, it was learned. Whether one of the four remaining commissioners will be appointed acting vice-chairman during Mr. Stevens's absence could not be ascertained.—*Nautical Gazette*, 1/2.

ALLEGED SUCCESS OF CONVOY SYSTEM.—The *Pall Mall Gazette* recently published an interview with Sir L. Chiozza Money, Parliamentary Secretary to the Minister of Shipping, on the question of ships and food.

Referring to the effects of the U-boats, Sir Leo remarked that the rate of our losses had fallen so greatly since the spring of 1917 that it is quite certain the enemy cannot beat us or starve us by a submarine campaign.

Regarding the convoy system, he said the public hear only of quite exceptional cases of loss without knowing what excellent results have been achieved. As regards homeward convoys, I have here a list of 186 homeward convoys, concerned with no fewer than 2430 ships, carrying no less than 17,500,000 tons of cargo. And what was the loss on the whole? Almost exactly $1\frac{1}{2}$ per cent.

As to food ships, so well have they been cared for that the recent losses, including the exceptional cases to which public attention has been directed, have been exceedingly small. In the last few months, for example, scarcely any of the wheat homeward bound to the United Kingdom has been lost by enemy action. But no one, added Sir Leo, should find excuse for waste in that statement, for, as has been said, the cumulative effect of past losses remains. Further, we have, unfortunately, had to divert food cargoes from the United Kingdom, France, and Italy.

If, therefore, I tell you, added Sir Leo, that the convoy system has been a magnificent success, I say no more than the truth, but that success does not put us back to the position we occupied before the serious losses began. Only new building by Britain and the United States can do that, and it will be some time before that building tells and raises the aggregate tonnage position of the Allies.

Commenting in its issue of January 14 on the above interview, the *Liverpool Journal of Commerce* comes to the conclusion that Sir Leo's figures are misleading. In part it says as follows:

A week ago Sir Leo Money is reported by the *Pall Mall Gazette* as saying:

"The public hear only of quite exceptional cases of loss without knowing what excellent results have been achieved. As regards homeward convoys, I have here a list of 186 convoys concerned with no fewer than 2430 ships carrying no less than 17,500,000 tons of cargo. And what was the loss on the whole? Almost exactly $1\frac{1}{2}$ per cent."

Observe the "no fewer" and the "no less," for we are inclined to the opinion that Sir Leo indulges in exaggeration when he wishes to appal

us by the immensity of the figures with which he dabbles. A week later he is reported by the *Daily Mail* as saying:

"Or consider the success of the convoys. The last report which has just reached me shows that over 18,000,000 tons deadweight have been convoyed with a loss of only 1.52 per cent. Or, take all inward cargoes. In the last four months the loss has been only about 3 per cent, of which only about 1 per cent is represented by food."

Sir Leo Money does not state that "the list" quoted in the *Pall Mall Gazette* is one and the same as the "last report" quoted in the *Daily Mail*. However, he speaks of 2430 ships carrying 17,500,000 tons of cargo, which he works out at 7200 tons per ship, and if he is sincere in his utterances he would speak of an average convoy of average ships, with the average deadweight capacity of 7200 tons. If we apply such figures to all inward cargoes in the last four months we find there is something wrong, else our figuring is not what it should be. During September, October, November, and December, there were 43,438 arrivals at British ports, according to the weekly returns issued by the Admiralty, and on an average carrying capacity of 7200 tons we have a total of 312,753,600 tons brought to this country. Obviously, this is wrong. Its ridiculousness is apparent on the face of it, and at the same time Sir Leo's own figures help to disprove it. He says "the loss has been only about 3 per cent," which represents 9,382,608 tons, or 1303 vessels. Yet the total of sinkings, out of arrivals and sailings, reported by the Admiralty in the same period is 311 vessels, of which 222 were 1600 tons gross and over, and 89 under 1600 tons. There is something wrong.

Again, he says 2430 vessels were convoyed with a loss of only 1½ per cent, that is, 36 vessels. (Again we say we do not know whether "the list" quoted in the *Pall Mall Gazette* is one and the same as the "last report" quoted in the *Daily Mail*.) A simple proportion arithmetic calculation tells us that if 36 vessels are sunk out of 2430, then proportionately 644 would be sunk out of the 43,438 arrivals during the last four months. But we are officially advised that there were only 311, and the deduction we draw from Sir Leo Money's illustration is that the proportion of sinkings is exceedingly high in the convoys. If 311 is the total sinkings, then proportionately only 18 should have been lost out of his convoys.—*Nautical Gazette*, 7/2.

THE WAR AT SEA.—The following is the first sentence of a leading article in the *Army and Navy Journal* of New York for December 8, 1917:

"From statements made by the navy authorities of France, England and the United States in the last few days it would appear that the long-looked-for more aggressive naval policy on the part of the Allies was in sight."

It has long been apparent to those who read the American professional journals and the expressions of opinion which have appeared from time to time in other American papers that the view was held very generally on the other side of the Atlantic that the naval policy of the Allies was susceptible to improvement. While praise was lavished on the officers and men of the British Navy and its auxiliaries afloat for their gallantry, endurance and technical skill, it was suggested that while the fleet was under the control of politicians suddenly called upon to face the problems of war in a serious way and insufficiently equipped for the purpose, it was unlikely that the very best use would be made of it. The United States, like this country, describes its navy as its first line of defence, but it has learned also the potency of its fleet as an offensive weapon. Like this country before the war, it possessed only a small but highly trained professional army, which on occasion it had used as the spearpoint of its naval forces. Although, then, when the United States came into the war, measures were taken to increase the land forces, it was to the navy that the nation looked primarily to assert its strength on the side of the Allies. Mr. Daniels, the Secretary of the Navy, in his annual report recited the steps taken by his department to cooperate with the fleets of the Allies,

and described the frank and free interchange of information which in the conduct of the naval war was a proof of "the partnership of democratic nations which will yet ensure a lasting peace."

The decision to create an Allied Council composed of the high naval officers of all the allied powers has been regarded as a significant sign of a change in policy more in accordance with this American view. This belief was held to have support in the statement made by Mr. Daniels on December 5 that "there is to be the greatest possible measure of cooperation between the American and allied navies. The plan is to get the highest degree of efficiency out of our naval forces wherever they may be needed." It has been admitted by the changes which have been made during the past year that a weak place in our Admiralty organization was the Operations Department, and among the measures which have been taken to strengthen this department Sir Eric Geddes has mentioned an infusion of younger officers with recent experience afloat. If, then, the *Army and Navy Journal* is justified of its surmise, the new policy will have as its sponsors not only the French and American professional writers who have pressed for it, but the young British naval officers with war experience, whose opinions after all must appeal more strongly to their countrymen.

It is not proposed to speculate here as to the form and substance which this more aggressive policy will take. Commenting on the appointment of Sir Rosslyn Wemyss, the *Times* said "our younger seamen are convinced that they can entirely overcome the submarine peril if they receive the free hand which they have never yet been granted," and the *Daily Mail* said of the new First Sea Lord that "his record suggests that young and energetic officers will find a more open path to promotion and greater opportunity of making good than was ever the case under the old régime." Obviously, there is here pointed out one direction in which offensive policy may make itself manifest. The *Westminster Gazette* also on this point says, "the younger school will be well advised if, with the experience of their predecessors behind them, they refrain from making promises and restrain their sponsors from promising on their behalf. What their plans are they will rightly keep to themselves, but their main defensive task is still to grapple with the submarine and to bring all their wits to bear upon mastering as well as holding that peril." On the other hand, the *American Journal*, which has been already quoted, looks further afield. We are told, "opinions have been advanced in Washington that the logical developments of the formation of the naval council are that either the American naval forces abroad will be sent to the Adriatic to join in a combined attack on the navy and naval bases of Austria, or that the Naval Council will control the merchant fleet of the Allies, and to our ships will be entrusted the entire task of convoying them." This is the kind of speculation which British writers and publicists are not prone to indulge in. It can serve no good purpose. More to the point it is to say that there is no likelihood whatever of "a younger British school," or the allied naval authorities conjointly, undertaking any risky adventures or ill-conceived "gambles," because our naval forces have now been reinforced by those of the United States.

That the strategy of a naval offensive can be pushed without incurring risks is absurd, and if there are any who believe that Admiralty reconstruction is going to prevent entirely mishaps, such as that to the three destroyers, or an occasional successful attack by the enemy on a convoy, they will assuredly be disillusioned before long. The public should bear in mind that not every German adventure turns out a success, and it is silly to describe every British mishap as a disaster or a catastrophe.—*Army and Navy Gazette*, 5/1.

CHIEF OF STAFF WILL REPRESENT ARMY ON SUPREME WAR COUNCIL.—General Tasker H. Bliss, chief of staff, who arrived in Paris to-day, will represent the United States Army on the Supreme War Council. Secre-

tary Baker in so announcing disclosed that the general is accompanied by high officers of every branch of the service to advise him about any question that may arise.

General Bliss attended the first meeting of the council and decision to send him back to Europe as a permanent representative in that body was made because it was recognized that General Pershing's duties in organizing and commanding the ever-increasing American Expeditionary Forces were too great to permit him to undertake the presentation of American views on military operations and to sit with the council in framing plans of strategy that cover all fronts and all armies.

No word of the departure of General Bliss had been published until the news of his safe arrival came.

From General Bliss the War Council will obtain an up-to-the-minute report on what the United States will be able to contribute to operations on the western front this spring and summer. His report in this regard has been forecast to some extent by President Wilson's statement to Congressional visitors that there would be in Europe in June twice the number of American troops which it had been originally planned to send by that time.

General Bliss also can inform his conferees exactly the situation in which the United States finds itself now as to delivery of supplies of all sorts to the Allies, and this information probably will have great weight in the shaping of war plans.

While Secretary Baker's statement merely said that General Bliss had arrived in France to represent the army on the council, there have been intimations that renewed recommendations for vigorous offensive operations on the widest possible scale were included in the instructions the general received before sailing.

Probably the primary consideration before the council when it reconvenes will be the widely advertised proposed German offensive on the western front. A mass of information has reached the allied powers from many quarters indicating an impending drive against the British or French lines, or both, which will be carefully reviewed.

The possibility suggested by Colonel Repington, the British military critic, in his initial article in the *London Post* to-day that the "German concentration may be to support negotiations" rather than for an assault is in line with views held by some American officers here. They feel that had Germany really intended to make a great drive she would not have given advance notice of it and are inclined to the opinion that the German high command is endeavoring to set up the bogey of a great attack as a preliminary to another peace drive.—*Baltimore American*, 24/1.

MINES PLAYING BIG PART IN WAR AT SEA.—Hunting and Dragging Bring Wireless and Aircraft Into Service.—How Germans Lay Them.—With the exception of the few general naval engagements which took place early in the war, sea warfare has consisted almost entirely of submarine attack and defence, along with mine laying and mine dragging. The warfare of mines has developed enormously during the last year, until its importance almost equals that of submarine warfare. At present it is a race to determine whether the Allies can drag the mines faster than the Germans can manufacture and lay them. Usually the Allies are able to keep the sea lanes clear, and sometimes the Germans manage to plant their mines in a position to keep several sea lanes blocked.

Almost invariably the Germans lay their mines from shallow draft mine-laying submarines, that carry but a few torpedoes, besides their eight or a dozen mines. These minelayers operate under cover of darkness, laying a string of heavily charged mines diagonally across the channels, often forming a double barrier to the sea route. Besides mining the channels at the entrance to important ports, the minelayers sow their charges off the coast along routes usually taken by convoys.

The Germans have concentrated their minelaying in a few regions—Saloniki, Malta, where one British officer dragged more than 200 mines; certain Italian ports; a few parts of the English Channel, the southern Irish sea, the eastern English coast and the Atlantic ports of France.

Before dragging the mines they must be located. This is done by means of a complete series of reports from all kinds of air and sea craft. Sea-planes, airplanes and scout dirigibles explore the channels and sea lanes whenever atmospheric conditions permit and especially ahead of each convoy. And to this group has been recently added the captive balloon, towed by a patrol boat. Hundreds of mine fields have been located by these means.

The aircraft, when a ship is running toward a newly discovered uncharted mine field, drop messages attached to cylindrical floats, which are picked up by the ships. However, especially at this season, the weather is prohibitive of good aerial patrol work.

Sometimes mine fields are discovered in ways that thrill. Several patrollers have seen mines at low tide in the trough of an extra large wave. And the patroller crews know enough of the mine's possibilities to fear it. Another costly but sure indication of the presence of a mine field is the blowing up of a ship. Often this is the first warning that the enemy has passed that way.

By wireless from the aircraft and the sea patrollers; by semaphore from the coast defence stations and by the detailed reports of each vessel that touches port, the locations of the mine fields are forwarded to the staffs of the different navies. Regularly published maps spread the news broadcast to warn all ships until the mines can be dragged and the dangerous channels and sea lanes once more thrown open to navigation.

Channel dragging is comparatively simple, because the space to be cleared is well defined and the proper moment can be chosen. Conditions of tide, wind and fog are not so important.

Off shore dragging, on the other hand, is very difficult for many reasons. In the first place, the exact location of the mine field is rarely known, hence an enormous area must be dragged in order to be sure that all the mines have been discovered. Sometimes aerial observers have seen "moons" and have reported them for mines. "Moons" are large round fish that have caused a lot of fruitless dragging.

Once the definite location of the mine field is known, the dragging can proceed quite accurately and rapidly by obtaining two points on shore. This is usually possible, since the mines are rarely laid in over 75 fathoms of water. Foggy weather obscures the landmarks and prevents dragging.

If the wind is high and a heavy sea is running it is impossible to drag, partly because of the danger of dropping on a mine in the trough of a sea and partly because of the impossibility of exploding or sinking the mines when the shears cut them loose. A drifting mine is a menace to friendly and enemy ships alike.

Conditions of the tide must likewise be considered for the angle given the mine cable; a strong tide would oblique the cable and hinder dragging.

Once at sea the Germans cannot touch their mines, because they are stored in compartments, opening at the bottom of the submarine. A pin is pulled out when over the channel or route to be mined and the mine falls of its own weight. When the mine hits the ocean floor the cable is released and the anchor, usually of the mushroom type, grips the bottom. The mine rises to the surface until a hydrostatic valve stops the unrolling of the cable. The desired distance is about 12 feet below the surface of the water.

Often the Germans make mistakes in setting the hydrostatic valves. Air pressure is considered, but this changes between the time the mine-layer leaves port and arrives over the area to be mined. Also, if the mines are dropped in a fast tide, they rise in an oblique line until the valve stops them when at the desired depth. Later, at slack water, the mines rise very near, or even to, the surface, where they are readily seen.

In the near future I hope to see some mines cut loose from their cables; to see them jump partly out of water; to see a well directed rifle shot from the little yacht break one of the four antennae surmounting a mine, thus causing the upheaving cataclysm following the explosion of 310 pounds of trinitrotoluol.—*Evening Star*, 28/1.

BLAMES VON TIRPITZ FOR U-BOAT FAILURE.—An article attacking the submarine warfare, which was suppressed by the German censor last October, has now been published "with the sanction of War Minister Von Stein" by the *Kiel Zeitung*. The article was written by Dr. Struve, a progressive member of the Reichstag, who asserts that the submarine war is a failure, and discusses at considerable length "who was responsible for the unrestricted submarine warfare agitation and for the statement that England could be forced to her knees within six months."

Dr. Struve asserts, after quoting a variety of witnesses, that the whole agitation was conducted and engineered by Admiral von Tirpitz after the latter's retirement. The article then develops into an attack on von Tirpitz and the new Fatherland Party for "getting Germany into this difficulty," and closes with the assertion that the submarine warfare might have been a success except for the fact that von Tirpitz, while in office, had neglected to build submarines in sufficient numbers to insure success.

"That was the reason," adds the writer, "that unrestricted submarine warfare was always opposed by von Capelle, Minister of the Navy, and the Imperial Chancellor, von Bethmann-Hollweg."—*Evening Star*, 9/2.

THE PROPOSED U-BOAT DRIVE.—Neither the Allies nor the United States are deceiving themselves as to the U-boat situation. And the United States knows well that it may expect this present year a drive of the submersibles against the Mexican coast points, for once it is seen that the war must be carried into the breakdown of Germany—that country will make a desperate effort to have the United States pay the cost of its entrance into the strife as heavily as possible.

Such is the outlook for the coming months. And the government, with its patrols and its nets and other measures will be quick and alert to offset the plans of the Germans and to frustrate their raiders. At any rate, the fact remains that the menace of a tremendous drive of the submersibles on this side the water, as well as the other, is apprehended. The most momentous drive on land and seas that the world has ever seen in military and naval action is the standard of probability that the United States' military authorities, in combination with those of its friends abroad, are taking as the standard of full preparation.

Either peace or the worst chapter yet of the war is the outlook—who can doubt which.—*Baltimore American*, 29/1.

LESSONS OF THE WAR

THE UNARMORED BATTLESHIP.—*Tendency is Toward High Speed, Great Gun Power, and Large Displacement.* By Commander Yates Stirling, Jr., U. S. Navy.—Until quite recently, the evolution of the battleship was based almost solely on the power of the gun, for the danger of the torpedo from a surface craft was being discounted. Battleships strove to carry sufficient thickness of armor to prevent shell penetration. Those nations who built their battleships with internal underwater armor reckoned only with a moderately heavy torpedo war head. That such underwater protection is wholly inadequate can be readily understood when it is remembered that a torpedo war head is now used which contains nearly 500 pounds of the highest explosive known. This is nearly double what was used at the commencement of the war.

The present-day battleships or the superdreadnoughts, as they are called, are fairly adequately protected from gun fire by their great weight of armor.

The maximum speed of the battleships is but little greater than that of the latest submarines. A battleship requires probably more than half an hour to go from its cruising speed to its maximum, while a submarine can be going at its highest available surface speed within a few minutes. A submarine can sight a battleship at a distance of about 25,000 yards or 12½ miles. A battleship can recognize a submarine in the awash condition at no greater distance than 5000 yards or 2½ miles. A submarine, on sighting an enemy ship, would immediately sink to as near the water as possible, in order to avoid detection, for a submarine, when silhouetted against the sky, can be recognized a long distance away.

If the battleship's course heads through the tactical area of the submarine, there is almost the certainty of destruction involved for the big ship, unless it is accompanied by numerous anti-submarine craft.

The control of the surface of the sea is an important factor in the command of the sea. To control the surface, gun power, coupled with high speed, is essential. To gain high speed, retaining gun power at a maximum, armor must be sacrificed. The evolution of the dreadnought battleship of 21 knots speed was shaken to its foundation when the submarine reached its present state of offensive development. England and Germany both realized this shortcoming in speed when they laid down, respectively, the *Queen Elizabeth* of 25 knots and the *Ersatz Kaiser Friedrich* of 23 knots. Although data is not available, armor protection was probably sacrificed for the added speed. Each nation aimed at the control of the surface.

The logical development of the *dreadnought* battleship is towards the maximum number of the largest caliber guns with the highest speed attainable on the displacement permitted by other circumstances. The *cruiser* development seems to be toward guns of larger caliber than that carried by a contemporary battleship and with higher speed for the purpose of outranging the battleship. The battleship probably will retain some armor, but when it finds itself outranged by its enemy and without the speed to force a closer action, it too must eventually sacrifice all armor for gun power and speed. Thus, the development of these two types, the dreadnought and battle-cruiser, appears to be toward an amalgamation.

From the very nature of the problem of defence of our shores we require a type in which must be combined great gun power, large cruising radius and high speed. We should be able to hold possession of our own waters. It does not suffice for our fleet to meet an enemy on or near our coast line; we must meet him beyond in order that our peace lines of communication may remain unmolested. This principle holds for every type of warship.

Barring England and Mexico, an attack upon the United States, in its initial stages, must be conducted in many vessels across many miles of sea. In the event of war, therefore, with an enemy across the sea, our first duty will be to gain touch with his attacking expedition as far from our coast as possible and convenient in order to harass and eventually annihilate it. Slow battleships seem to have no place in our "attacking" fleet. We should have types capable of "controlling the surface" from our shores to the advancing enemy. By this means we shall lessen, if not eliminate, the danger of enemy submarines, and give our own mobile offensive type of submarines an added value. Gun power, radius of action, and speed are essential for this work. These are the pivotal attributes. To gain them, all purely defensive attributes will have to be sacrificed.

Every nation must eventually reach a maximum limit of displacement, which it would be ruinous financially to go beyond. In our case this limit is for all times fixed by the size of the Panama Canal locks. These locks have the following dimensions:

Length	1,000 feet
Width	110 feet
Depth	40 feet

This most important passage, enabling us to concentrate a fleet in either ocean, can pass in safety a vessel with the following maximum dimensions:

Length	950 feet
Beam	100 feet
Draft	36 feet

"You cannot have anything for nothing," is a truth that the naval constructor and designer of warships never ceases to expound to the sea officers who seem to want thick armor, great gun power, and high speed on a moderate displacement. There must be sacrifices. The least important must feel the knife.

If great speed is desired while retaining maximum gun power, radius of action, and armor protection, we must send the displacement to illimitable heights. The figures in table No. 1 are authentic and sufficiently accurate.

If, on the other hand, we thin down the armor to what has been termed by naval architects the "Safest minimum," we have the figures given in table No. 2.

From the figures in the tables a comparison of the two largest ships capable of passing through the Panama Canal would appear instructive.

With maximum armor we can build a vessel of 45,000 tons of 26 knots speed; with safest minimum armor, one of 39,500 tons of 29 knots speed. Gun power has been taken as equal; that is each is armed with twelve 14-inch guns. The two vessels having the same caliber of guns must fight at a range within the capabilities of that caliber. At the range which must be chosen the 8 inches of armor carried by the faster ship will not furnish adequate protection. It is, therefore, weight wasted, which should have been put into a larger caliber of gun to enable the faster and more lightly protected ship to outrange the slower.

The warship of highest speed with guns outranging any vessel afloat need carry no side armor for protection against the gun. Even the number of guns carried is unimportant except to shorten the time required to destroy an enemy. Once a vessel embodying this idea is built, a similar but faster and stronger vessel in a rival's fleet will appear. Thus, we shall see the old course of evolution repeated in a new cycle.—*Scientific American*.

THE DESTROYER AND THE TORPEDO.—*High Speed and Quick Turning Ability the Effective Answer to the Torpedo*.—The torpedo is not, in the military sense, nearly so important a weapon of offence as it is popularly supposed to be. We say "in a military sense"; for the enormous destruction of unarmed and helpless merchant shipping which the Germans have accomplished, is not a military operation, but mere outlawed piracy. If Germany had obeyed those humanitarian laws of war, which are the outgrowth of many centuries of endeavor to protect the non-combatant from the cruelties and losses of war, there would have been a comparatively small toll of sunken ships to their credit.

All through the history of the development of torpedo warfare, the inventors, in their plans and specifications have shown that they were trying to devise some means of sinking warships, unseen by the enemy. Bushnell, Fulton, and Holland in this country, to say nothing of the French and Italian inventors, carried in their minds as the object of attack only the warship. The merchant ship, they well knew, was recognized, in the universal opinion of civilized nations, as exempt from torpedo attack.

To Germany belongs, and will forever belong, the distinction of being the first naval power to break away from those safeguards of human life which have the sanction of centuries behind them, and divert the torpedo from its legitimate work as a weapon of war, and use it as an instrument for the wholesale murder of passengers and sailors upon the high seas.

So having now disabused our minds of any undue appreciation of the torpedo, drawn from its misuse against helpless and unarmed ships, we shall be prepared to recognize the surprising fact that against swift and well-

guarded warships, the torpedo has shown itself, in the present war, to be a surprisingly ineffectual weapon. Thus, in the battle off the mouth of the Elbe, lasting several hours, in which some 50 to 60 ships, all heavily armed with torpedoes and using them very freely, were engaged, not a single torpedo hit, if we remember rightly, was reported on either side. Even more significant is it that in the great battle of Jutland, in which over 120 ships were engaged, and the destroyer flotillas were exceedingly active, only one torpedo hit was made on the whole of the British fleet, which must have included at least 70 to 80 vessels of every type. The battleship *Marlborough* was struck near the stern and listed rather heavily; but she was able to bring herself back to a level keel and continued the fight.

High speed and quick turning power have proved to be the best defence against the torpedo. The fast battle-cruisers and scouts are well able to take care of themselves and the slower battleships are protected by numerous screens of destroyers, each flotilla being led by a fast light cruiser, carrying heavy torpedo defence guns, of from 4- to 6-inch caliber.

The failure of the torpedo to get in very much effective work against naval vessels is not due to the inefficiency of the torpedo itself; for the torpedo is indeed a wonderfully efficient weapon. It is stated that our latest 21-inch superheat torpedo will travel with marvelous accuracy for 10,000 yards at a speed of between 30 and 40 knots. Target practice with these weapons, in time of peace, has proved that it will do this consistently; but target practice conditions, when the target is stationary or moving at a comparatively slow speed, and conditions in a sea fight, when the enemy's ships are moving at from 20 to 35 knots, are two very different propositions.

The failure of the torpedo against warships is not due to the weapon, but to the human element—the great difficulty of estimating the distance, speed, and course of the enemy's ship. This is so far recognized in battleship tactics, that no attempt is made to fire the underwater torpedo tube of a battleship against the individual battleships of the enemy's column. The torpedoes, should the two fleets come within torpedo range, say 10,000 yards or less, would be discharged against the enemy's line as a whole, on the chance that while many of the torpedoes would pass between the ships, others would score a hit. The modern warship is about 200 yards long and the interval between the ships is about 500 yards, if they are keeping proper station, so that theoretically two out of seven torpedoes should hit the mark.

It is extremely difficult to hit a fast ship at a distance of 5000 to 10,000 yards. Thus, a 700-foot battle-cruiser going 30 knots will cover a distance equal to her own length in 14 seconds, whereas it will take a torpedo of the latest design at least eight minutes to reach a ship 10,000 yards away. Now a 30-knot ship, moves at the rate of 50 feet per second, and hence it is necessary for the torpedo officer to estimate very closely the distance of the ship and the speed at which she is traveling, before he can determine how far ahead of the position of the ship he must aim his torpedo if ship and torpedo are to meet some minutes later. If he estimates the ship is traveling 30 knots, when she is traveling only 25, and calculates the course of his torpedo accordingly, the torpedo will reach the proposed meeting point too soon and will pass ahead of the ship. Vice versa, if he estimates she is traveling 25 knots when she is really going 30, his torpedo will arrive too late and will pass astern of the ship.

How difficult these calculations are is proved even in the attack by submarines at close range on slow-speed merchantmen; for many times during the past two years it has been recorded by the officers and crew of such ships that torpedoes have passed ahead or astern of them.

In spite of its visibility, the 30- to 35-knot destroyer, carrying from 8 to 12 torpedo tubes, is the most effective means for torpedo attack. The work is hazardous, of course, but several flotillas of these craft, rushing down upon the enemy at 35 knots, particularly if they are protected by a smoke screen, are very likely to get a battleship or two, even though several of them are disabled or sunk by gun fire.

The smoke-screen or smoke attack, which has been used so frequently and effectively in this war, originated in the United States Navy, being first used in our destroyer fleet, when it was under the command of Captain Eberle. The writer well remembers being present at such an attack off Block Island several years ago, when five groups of destroyers, 20 in all, crossed the head of a column of battleships, until they were in the windward position, and then, with the leading destroyers smoking heavily, swept down the line of the enemy at a distance of about 1300 yards. The pall of dense smoke rolled down to leeward, enveloping the enemy and screening the destroyers from observation; but above the dense and low-lying bank of smoke could be seen the successive pairs of fighting tops of the battleships; and, had the maneuver been an actual battle, some of the capital ships would have been heavily torpedoed.

In the battle of Jutland, the German destroyers made use of this smoke-screen as a protection to their own battleships, when they were being heavily hit by the battleship divisions under Admiral Jellicoe. A noticeable feature of that fight was the use of fast 30- to 35-knot light cruisers, armed with 6-inch guns, as leaders of the destroyer flotillas. One well-placed shot from a 6-inch gun will usually cripple a destroyer, if indeed it does not sink her, and the object of these light cruisers is to lead the attack, break up the counter-attack of the enemy, and bring her own destroyers within torpedo range.—*Scientific American*.

PRESIDENT WILSON ON THE FREEDOM OF THE SEAS.—In the course of his masterly address before the House and Senate, setting forth the fourteen terms of peace for which we are "willing to fight until they are achieved," President Wilson stated that the United States stands for "absolute freedom of navigation upon the seas, outside territorial waters, alike in peace and war, except as the seas may be closed in whole or in part by international action for the enforcement of international covenants."

Now, this, the true freedom of the seas, is a very different matter from the freedom of the seas which Germany is seeking to bring about.

We stated in our editorial upon this subject, last week, that Germany has never given any clear statement of what she intended by the phrase; and it is certain that no formal definition has ever been made by the German Government.

But although the government, for obvious reasons, has been silent, one of Germany's leading naval and military critics, Count Reventlow, has declared his interpretation of the phrase in terms which remove the last vestige of doubt as to what he and, it is reasonable to suppose, the German Government has in mind. For Prof. Selfton Delmer, who was present at a mass meeting in Berlin last March, when the Count lectured on war aims, has recently supplied the *Daily Mail* with a translation of certain passages from the address, which leave no further doubt as to the manner in which Germany interprets the "freedom of the seas."

Attention is drawn to this translation in an article contributed to the *Naval and Military Record* by the well-known British naval critic, Hector C. Bywater (for many years a resident of Berlin) who quotes Count Reventlow as follows: "What do we Germans understand by the 'freedom of the seas?' Of course, we do not mean by it that free use of the sea which is the common privilege of all nations in times of peace, the right to the open highways of international trade. That sort of freedom of the sea we had before the war. What we understand to-day by this doctrine is, that Germany should possess such maritime territories and such naval bases, that at the outbreak of a war we should be able, with our navy ready, reasonably to guarantee ourselves the command of the sea. *We want such a jumping-off place for our navy as would give us a fair chance of dominating the seas and of being free of the seas during a war.* The inalienable possession of the Belgian seaboard is therefore a matter of life and death to us. Our aim must be, not only to keep what

our arms have already won on this coast, but sooner or later to extend our seaboard to the south of the Straits of Calais."

So here, at last, the truth is out. The freedom of the seas is to mean freedom for the shipping of all the world until such time as Germany may see fit to declare war, when freedom of the seas is to become a German monopoly. Now, in view of the fact that this question of the seas is to figure so prominently in the terms of peace, whenever these shall come to be discussed, Count Reventlow has certainly done the world good service by thus so unreservedly letting the cat out of the bag.

"It is not the freedom," says Bywater, "but the absolute mastery of the seas that Germany covets, and scarcely a day passes without bringing new proof of this ambition." Thus in a recent issue of the *Deutsche Tageszeitung*, Count Reventlow made a vigorous demand for the full exploitation of the military successes in Italy. Austria-Hungary, he declared, absolutely needed the freedom of the Adriatic for her future development. "We confine ourselves to-day," he wrote, "to a general statement of our aims—that for the future an active Adriatic policy on the part of Italy shall be made completely impossible, and this, not by paper guarantees, but by real guarantees—that is to say, by appropriate territorial changes on the coast of the Adriatic." Evidently, the Teutonic alliance, if successful, intends to annex all the important strategic points on the Italian side of the Adriatic, and form a chain of bases that would enable its naval forces completely to dominate the Mediterranean. But Count Reventlow would not stop there. He would secure "two central points of power,"—the Adriatic and Constantinople with the Dardanelles. Such political, maritime and economic position would stand in the closest combination with the position of the German Empire in the Baltic and on the coast of Flanders. Says Bywater: "Here we have the same cynical avowal of the real aim that is disguised in the 'freedom of the seas' catch-word." With the Baltic a German lake, all the northern waters would be ruled by Germany; with the Flanders coast and the Pas-de-Calais fortified and honeycombed with naval bases, she would sit astride of every trade route converging on England; while from the strongholds of the Adriatic her raiders could issue forth to close the Mediterranean.

It is the command of the seas by the Allies that has saved the world from subjugation by the Teutonic alliance, and when the military and naval power of Germany has been completely disrupted, and the various plenipotentiaries assemble for the peace conference, this question of the "freedom of the seas" must be placed on such a sure basis and secured with such rigid guarantees, that this dream of Reventlow and the Kaiser for whom he speaks, shall be placed beyond any possibility, not merely of attainment but even of attempt.—*Scientific American*.

EXPERT CONTROL IN CONDUCT OF WAR.—Mr. Spenser Wilkinson, professor of military history at Oxford, and author of the article on "The Dardanelles" reprinted in the February PROCEEDINGS, has an interesting essay in the January *Nineteenth Century and After* entitled, "The British Constitution and the Conduct of War." His general thesis is that the governmental machinery established by the British constitution, while admirable in time of peace, has this weakness in war, that it fails to provide expert leadership and control of war departments and operations. In support, he quotes the Marquis of Salisbury, speaking in the House of Lords at the time of the South African War:

"If you will look back over the present century [he said—the nineteenth century] you will see there have been four occasions on which the British Government has engaged in war. On each occasion the opening of these wars was not prosperous. These were the Walcheren Expedition, the Peninsular War, the Crimean Expedition, and now the South African War. In all these cases at first—in the case of Walcheren not only at first—there were lamentable losses. . . . We cannot have been so unlucky

as to have fought four times and to have lighted upon the most incompetent and worthless ministers that the world has ever produced. It is evident that there is something in your machinery that is wrong."

Mr. Wilkinson points out that the executive branch of all governments, whether monarchical or democratic, consists of a set of ministers and a chairman, the chief difference being that in monarchies the king either holds the position of chairman himself or selects his leader, whereas in democratic systems the leader is selected by popular vote, either directly or indirectly through a legislative chamber.

Speaking in general, the most important member of this committee or cabinet in time of war is, in Mr. Wilkinson's judgment, "the designer of victory, the exponent of the general's art, of which success in war is the object. In many governments no such office is found among the ministers because the task is reserved for himself by the head of the government, the King or Emperor. Of some governments a commander-in-chief is a member, and in the United States the command of the forces is by the constitution vested in the President.

"Some representative of the art of war is always necessary, for every question of policy is in the last resort one of force, and the key, both to the avoidance of war and to success in it when it becomes inevitable, lies in the due co-ordination of policy and strategy. The mode in which that co-ordination must be sought is a conference between the chairman of the committee, the minister of foreign affairs and the strategist, on each occasion when any new departure is taken in external policy. At such a conference the foreign minister would explain the course he had to propose, the strategist would then say what it might involve in case of conflict.

"Throughout the course of a war the strategist is required by the government; for once the appeal has been made to force, by force the issue is decided. Yet nothing is so common in war as for persons of great influence to urge a government to scatter its forces for purposes not directly conducive to victory though thought in themselves desirable. Especially is this the case when the possession of particular places seems advantageous or likely to influence opinion at home or abroad. Few but trained strategists understand that in war everything can be had by victory but nothing without it; and that victory requires the concentration of all possible forces to strike a blow at some one point in order to destroy the enemy's fleet or his army. There seems to be no limit to the errors in the direction of fleets and armies that can be committed by governments in the deliberations of which the voice of strategy is silent, divided or overruled.

"The strategist is even more essential to a government than the minister who maintains the naval or military forces, for that minister must base his arrangements on the requirements of the fighting, of which the strategist alone can judge. The minister's presence in the governing committee is needed mainly in order that his financial proposals may be presented to the representative chamber with all the authority of government.

"In the case of a maritime state and especially of an insular power there must of course be two strategists: one for the navy and one for the army, for the mastery of both sea and land warfare is rarely combined by one man."

After a historical review of control of the Army and War Department in England in time of war, Mr. Wilkinson turns to the navy:

"In the epoch of Nelson and Napoleon, the action of the navy was directed by a board which represented the Lord High Admiral in Commission. Another board was entrusted with the duty of supplying the ships and stores which formed the material portion of the fleet. But before the beginning of the reign of Queen Victoria, these two bodies were amalgamated into one, which combined the functions of command and supply. The chairman of this Board of Admiralty was the First Lord, the Cabinet Minister, a political personage unacquainted with war. Its

other members were four Sea Lords, one or more Civil Lords and a secretary. The political chief, the First Lord, had power, with the concurrence of one other member of the board, to act in the name of the whole committee. In 1895 I ventured to criticise this arrangement by pointing out that it failed to provide the navy with a commander-in-chief for war, and suggested that the First Sea Lord should be made commander-in-chief and be given authority in peace and war to issue all orders for the distribution and movement of ships and fleets; that his should be the office in which should be prepared all orders to the admirals commanding squadrons or fleets, and that he should be selected on the sole ground of his strategical and tactical qualifications for this duty. These criticisms and this proposal were supported, for a few weeks only, by the Navy League, with the net result that the First Sea Lord was formally recognized by the government as its naval strategical adviser. But there was no consistent attempt to select a First Sea Lord on the ground of mastery of naval operations, and no attempt whatever to relieve him of the many administrative duties to which it was impossible he could properly attend if he really devoted himself to strategical problems and to the study of the operations of a future naval war. Mr. Churchill, indeed, on becoming First Lord of the Admiralty in 1911, created at the Admiralty an office akin to that of the chief of a General Staff of an army, but the head of this office was not made a member of the Admiralty Board, and occupied a comparatively subordinate position.

"During the course of the war there has been some slight development. The Chief of the Admiralty Staff has been brought into closer relation with the First Sea Lord, whose function as strategical director of the navy has been emphasized, though he still seems to be more deeply immersed in general administrative business than is consistent with complete concentration on the business of a strategical direction, which ought always, in my judgment, to be inseparable from his position. Authority without strategical insight must be expected to fail in war; for without the judgment produced by a life's study of the operations of war, no man can hope to solve happily the problems which war presents. But no insight will avail unless it is coupled with authority. A strategist who has not the power to have his solution carried out and put into execution is not a commander.

"The government has lately appointed a most distinguished administrator to be First Lord of the Admiralty. It is beyond doubt a wise move to appoint an administrator to be the head of the administrative business of the navy. And this, according to my reading of the lessons of history, would be best accomplished by reviving the distinction between supply and command. Command should be the function of the First Sea Lord; his should be the voice to explain in the cabinet his design for the conduct of the naval war; his the voice communicating that design to the naval officers afloat. If the administrator must also be a First Lord, it might conduce to a better understanding of his functions if he were to be called the 'First Shore Lord.'

"There are two delicate points which I have hitherto passed over. The first is, the place, in a geographical sense, of the commander-in-chief of either service. Should he be at the headquarters of the principal army or of the main fleet, or should he remain at the seat of government? I suggest that this should be left entirely to him. The modern facilities for movement from place to place and for the transmission of documents—even of considerable length—make it easy for a commander to communicate his views from one place to another.

"The great difficulty consists in the selection of men qualified for supreme command. To produce leaders is the chief function of national education; to discover them and to put power into their hands is perhaps the highest and the hardest function of the statesman. For there is no selection without rejection. The task is, however, less difficult in war than in peace because in war everyone understands the application of the precept 'by their fruits ye shall know them.'

"The general answer to the question raised by the title I have chosen is that the cabinet system is a machine suitable for the conduct of war, provided the cabinet is a council of heads of the great departments—under the presidency of the Prime Minister—and provided also that each minister is a master of the subject with which his department is concerned. Its efficiency is diminished in proportion as the members lack the necessary command of their subjects, and by the presence of members having no departments to supervise. Only the head of a department can be fully in touch with the problems that arise in it; and the opinion of a person deprived of that touch is apt to be in the nature of advice in the air.

"The story which I have told of the attempts of governments carried on during a quarter of a century to set in order the machinery for the direction of the army and the navy, illustrates what I believe to be the chief weakness of our national life—the want of faith in knowledge.

"The members of a government require more than ability; each of them requires a mastery of a subject, of the art or science upon which are based the activities of the office which he aspires to direct, and of its application. This mastery is to be had only through a long apprenticeship—the devotion of the best years of a man's life to the profession to which he is called. There are only two methods of forming a committee for governing a nation—for directing the nation's work. One is that hitherto practiced, by which a personage distinguished by party services, or by anything except mastery of the business which he is to superintend, is placed as Cabinet Minister at the head of a department, while its permanent chief, presumably the competent man, is made his subordinate, his adviser whose advice he may reject. This is government by incompetence. It has been accompanied by inefficiency and confusion and can lead only to defeat. The other method is to appoint as Cabinet Minister at the head of each department the most competent master of the work which that department has to do. The old wrong method was due to conditions which made the consideration of party all-important. It may be doubted whether, worked on that method, the constitution is as satisfactory as the late Lord Salisbury thought it for the production of happiness; assuredly it will never produce victory. But in war the mere thought of party is treason.

"Unless the spirit in which the constitution has been worked for the last 50 years is changed within the next six months, the constitution and those who have worked it will disappear in defeat and revolution. To-day the submarine and the aeroplane are telling all men that the alternative is between defeat and victory. Victory cannot be won by a government of amateurs. A government that seeks victory must begin by entrusting the conduct of the war to men who understand war."

DAZZLE SHIPS.—The following statement has been issued through the British Press Bureau:

"It has been stated at various times in the press that the Admiralty have not realized the value of camouflage as a means of assisting to defeat the attacks of enemy submarines on mercantile shipping, and that such camouflage as has been tried is not of British origin.

"It can be stated that the Admiralty are fully alive to its value, and several months ago a system of camouflage was originated. The principles governing it cannot be divulged at present, but it may be said that it has not invisibility for its basis.

"The theory of rendering ships invisible at sea by painting them various colors is no longer tenable; endless endeavors have been made in this direction, and numerous schemes given fair trial by the Admiralty under actual conditions at sea.

"The results of these trials have invariably been disappointing, and it has been finally established that, unless a vessel and her smoke can be rendered absolutely invisible, no useful purpose is served.

"The application of Thayers law is most commonly put forward as a means of obtaining invisibility. This, broadly speaking, is an adaptation of nature's means for eliminating shadows, and so reducing the visibility of birds and animals at close quarters, either for purposes of attack or defence, and it is stated that this can be applied to ships by painting the ceilings of promenade decks or other projecting structures white, in order to eliminate all shadows.

"Actual experiences at sea have proved that this is a fallacy, and that the paint itself being dependent on the light of the sky will not overcome shadows.

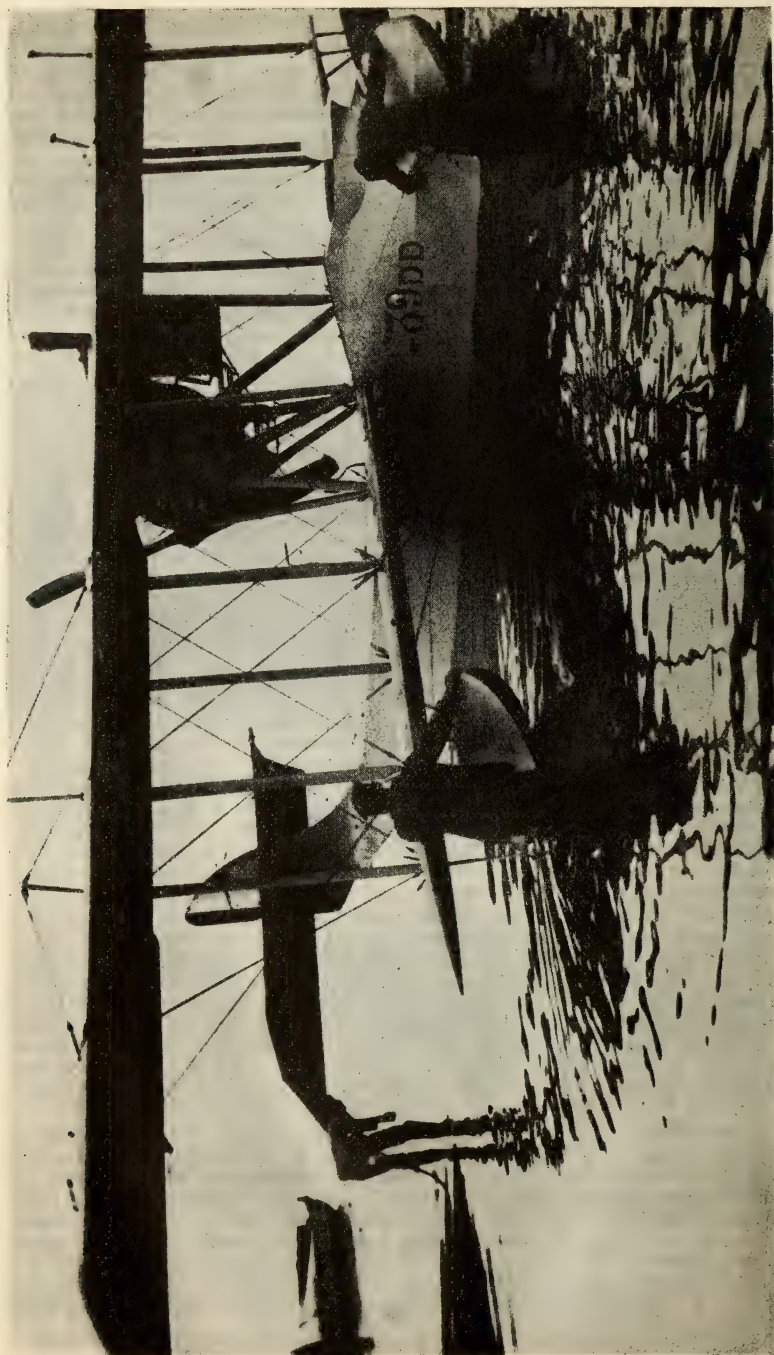
"The scheme now in use has been extensively taken up, not only by the British, but also by the allied governments, and no stone is being left unturned to utilize this important asset, which is only one of the many devices which are used to combat the enemy's submarine activity."—*Nautical Gazette*, 31/1.

THE NEED OF CONVOYS.—With the expansion of the shipbuilding program, it has become necessary for the naval authorities to take up the question of furnishing a sufficient number of convoys for the increase in vessels that will be available for oceanic transportation of troops and supplies. At present there is a deficiency in this type of vessel. For many years the Navy Department regarded vessels now suitable for use as convoys as of no special military value. They were useful, of course, in certain waters and on certain duties, but the policy of naval construction favored, instead, destroyers and capital ships so that the small cruisers and the gunboat were overlooked without anticipation of the great value and serviceability they are in this war. It is necessary, therefore, to provide ships of this type with the least possible delay in order to have them ready for service by the time a corresponding number of transports is available under the completing plans of the shipping board. These should be, it is represented, as of from 1500 to 1800 tons displacement, with speed of 16 knots.—*Nautical Gazette*, 31/1.

FAILURE OF THE WOODEN SHIP.—Rear Admiral Bowles, testifying before the Senate investigation of the affairs of the Shipping Board and the Emergency Fleet Corporation, was forced to admit that the wooden ship plan was a failure. His evidence completely vindicates General Goethals's stand, and proves that Mr. Denman's plan to build a thousand wooden steamships is absolutely impracticable, and that there is not enough lumber available to build the half of them.

Admiral Bowles said that, in his judgment, 90 per cent of the effort spent upon wooden ship construction could have been better utilized in building steel ships, which are much more quickly constructed than wooden vessels. Mr. Hurley's position is understood to be that the construction under contract of wooden vessels is far advanced, and that he will push through those already started, although it is certain that the United States cannot build more than 250 wooden ships in 1918, and it is very doubtful if they will be of any use for transatlantic service. All the efforts of the Shipping Board are being bent on the construction of fabricated steel ships.

It is now apparent that one of the principal causes of the unsatisfactory tonnage situation is Mr. Denman's adoption of thoroughly impracticable plans for wooden ships, on which, since the beginning of May, millions of dollars have been wasted, transportation systems taxed, and the labor situation strained all to no purpose, when, if the energies had been devoted to steel construction, the ships would now be in the water.—*London Times*, 31/12.



FRENCH PLANES GUARD AMERICAN NAVAL BASE IN FRANCE.
Photo from Underwood & Underwood, N. Y.

ATLANTIC

SIX U. S. SEAMEN KILLED BY FALLING FOREMAST ON THE U. S. S. "MICHIGAN."—Secretary Daniels gave out the following statement this morning:

In a heavy gale at sea on January 15 six men were killed and three injured on the U. S. S. *Michigan* by the falling of the foremast.—*Official Bulletin*, 17/1.

PATROL BOAT ON ROCKS.—An American patrol boat was to-day reported to the Navy Department ashore on a rock in European waters.

The vessel went ashore during a fog on January 25. There was no loss of life or injury to the crew. The vessel will probably have to be abandoned.—*Baltimore American*, 29/1.

LOSS OF THE ARMY TRANSPORT.—The first loss of an army transport has been mercifully lacking in a formidable casualty list. The place of the occurrence of the sinking of the *Tuscania*, while evidently a surprise, was accountable for the rescue of so many of those on board. The accident has failed to produce the sensation, while it has not failed to arouse public sympathy, expected of the loss of the first army transport en route to Europe. It has been felt that a dire disaster was needed to stir the people of this country to a realization that we were actually at war. It was appreciated that this would be an exceedingly heavy price to pay for securing the necessary national ardor and resentment against an enemy necessary to give support to the war. The successful attack by the German submarine in this case is probably only the beginning of like disasters, of which the public has been repeatedly warned. It has the immediate effect of effectually dispelling the complacent impression that our adversary did not seriously intend to attack our troop ships for some occult reason that would have been characteristic enough in some particulars, but hardly supposable of pitiless, determined German warfare in the presence of an opportunity. The disaster invoked the following statement from the Secretary of War:

The sinking of the *Tuscania* brings us face to face with the losses of war in its most relentless form. It is a fresh challenge to the civilized world by an adversary who has refined, but made more deadly, the stealth of the savage in warfare. We must win this war, and we will win this war. Losses like this unite the country in sympathy with the families of those who have suffered loss; they also unite us to make more determined our purpose to press on. As rapidly as details come in they will be given to the public in order to relieve anxiety where possible, and notice will be sent as promptly as possible to those whose sons and brothers have been added to the nation's heroic dead.—*Army and Navy Register*, 9/2.

This was not in the zone patrolled by the U. S. destroyers.—*N. Y. Times*.

OUR HARDY DESTROYERS.—*One in European Service Steamed 25,000 Miles Without Docking*.—American destroyers are standing the strain of war service in foreign waters better than the most sanguine official here expected. Recent reports from the destroyer force show that few vessels have been out of commission for any length of time for repairs, despite the arduous character of their work. The seamanship of the men aboard the fighting craft and the skill of the picked forces on the repair ships are held responsible for the result, although substantial construction, selected material and good designing play their part.

The most striking instance of the seaworthiness of these light craft is that of a destroyer which went into drydock only after having steamed more than 25,000 miles. Examination showed the boat needed only scraping and painting. Her engines and machinery equipment generally had been kept in perfect order by her own men and the repair ship crews while she was afloat.

The durability of the boats is especially striking in view of the fact that their plating is only a little more than a quarter of an inch in thickness. They were not built for high speed in rough water, yet the call of a merchantman, beset by a submarine, sends them plunging through gigantic seas at a racing gait. There have been cases where the impact of the water twisted the bows somewhat, but these are few, and the damage was easily repaired. Steering engines have worn out, and boilers have been replaced or retubed, in most instances by the repair ships. British officials have expressed high admiration for the handling of the flotilla in this regard.

A complete supply of spare parts for the boats has been assembled at the base, and the officers in charge of the engineering problems are picked men.

As the destroyer construction program moves forward at home, the strain on the boats abroad will lessen. Congress has been warned, however, that the strenuous character of the work in chasing submarines is certain to wear out some of the older boats.—*N. Y. Times*, 21/1.

U. S. FLEET ON GUARD WITH BRITISH.—We are apt to forget that over on the other side the control of the surface of the ocean has been absolutely maintained by the existence of the British battleship fleet. There have been a few raids on the coast of England, and a few engagements in the North Sea, but to-day the relative strength of the British Navy is at least as great against the German Navy as at the outbreak of the war. Furthermore, they have the active cooperation of the French and American surface ships of heavy tonnage. We have, of course, many battleships on this coast that little is heard about. We have had to use the oldest ones largely as training schools, especially for the training of the gun crews of the merchant ships. (From speech of Assistant Secretary of the Navy.)—*N. Y. Times*, 17/2.

The work of the United States is not now confined to destroyers. The Secretary of the Navy, Mr. Daniels, has announced that naval vessels of every type are now doing service abroad.

The most definite information on this subject, however, is given by Representative Miller, of Minnesota, who recently returned to the United States after interviewing many British and French naval commanders.

The American battleship fleet is no longer "bottled up" in sheltered waters in fear of submarine attack. Several of the first-class ships have been sent abroad. These are coal burners, which for a time, at least, will relieve the British battleships of the oil burning type.

What portion of the fleet is now working with the British Navy is, of course, kept a military secret, but the American people at least have the assurance that the United States Navy is doing its full duty in maintaining the allied guardianship of the seas.

The facts about the American fleet are woven into a speech made in the House by Representative Miller in the course of a presentation of war conditions as he observed them while abroad. His statements, made partly because he told of things he saw and partly from things he was told by British and American naval commanders, shed a light upon the whereabouts of the American fleet and its operations that hitherto has been locked in the secret archives of the Navy Department.

Mr. Miller frankly told the House that when he was there Vice-Admiral Sims had 36 destroyers—not the number now—with which to patrol waters assigned to him. These waters extended west of the coast of Ireland, down across the western entrance of the English Channel, clear across the western coast of France and Ireland, the coast of Spain, down to the Azores Islands.

"This number was grossly insufficient," Mr. Miller said, "but the navy has started on a program that will produce any needed destroyers. Some of these destroyers are being delivered."

Before the sinking of the *Tuscania*, which occurred in waters outside the zone being protected by American craft, Mr. Miller said that disaster had been narrowly averted more than once, and that the navy's first duty was to protect the line of communication between France and America.

The speaker said he was in Europe when the request was made for American battleships, and he said that request had been granted.

"They have been sent," he said, "and no better battleships ever floated on a sea. I was afraid our navy would not send them, but I made particular inquiry and followed it up and found they have been sent."

That the American war craft are in the thickest of the submarine danger zone is shown by what was said of the area covered by the German submarines. Much of this area is said also to be covered by American craft.

"The main submarine base," Mr. Miller said, "is at Zeebrugge, on the North Sea. The main area of operation is across the northern part of Scotland and the upper part of Ireland, and then the English Channel. Continuing, their field is the Bay of Biscay, then along the coasts of Spain and Portugal, and then out to the Azores."

"Moments of grave danger are just about sunrise in the morning and sunset at night, especially if the sea is calm. Because during that twilight period there is that uncertainty of light which makes it difficult to discover the periscope of a submarine, but easy for the submarine to see the hulk of the ship in bold relief," said Mr. Miller.

In showing the valuable contribution made to naval strategy by Vice-Admiral Sims, Mr. Miller said his suggestion was this:

"What is the use of sending destroyers and ships of your navy scouring the seas, hunting for submarines? The seas are vast and the submarine is small. They may seek for days and weeks and not find their quarry, but you group your ships together and put your destroyers about your ships and you are bound to have your destroyers meet the submarine. The submarine must find the ships and in finding the ships he meets his deadly enemy."

This suggestion of Vice-Admiral Sims was finally accepted by the British Admiralty.

Mr. Miller declared Congress and the Navy Department should give Admiral Sims absolute carte blanche and carry out whatever he recommended.

Mr. Miller related this incident to emphasize his belief that there should be better co-ordination in the handling of both merchant ships and the protecting war craft.

"Two ships had left a port in France and were some fifty miles up the coast when instructed by wireless to wait for some other boats. They were to leeward of an island, with all communication between them and the shore cut off.

"After they had waited five days the destroyers to escort them through the submarine zone appeared. For some unaccountable reason the ships did not sail even then. The destroyers fooled around, going back and forth for further orders. On the eighth day, under most unfavorable conditions, this group set forth. Why, submarines had been for a week spotting exactly where they were. Is it any wonder they were attacked twice before they got through the zone?"—*N. Y. Herald*, 15/2.

GERMANY EXTENDS SUBMARINE BLOCKADE ZONE; U. S. IS NOTIFIED THROUGH THE SWISS LEGATION.—The Swiss Legation in Washington has transmitted to the Department of State the following communication from the German Government:

"Supplement to the German declaration of January 31, 1917, concerning the blockaded zone.

"On and after January 11, 1918, a new zone of sea is declared blockaded around the enemy point of support in Cape Verde Islands and Dakar and the adjoining coasts. That zone is bounded as follows:

"From the Cape Palmas lighthouse toward the point $10^{\circ} 0' N.$, $29^{\circ} 30' W.$, to the point $17^{\circ} 0' N.$, $29^{\circ} 30' W.$, to the point $20^{\circ} 30' N.$, to the point $25^{\circ} 30' W.$; there the line follows the parallel $20^{\circ} 30'$ latitude northeastwardly as far as the point where that parallel strikes the western coast of Africa.

"On the same date the zone blockaded around the Azores will be extended eastward as far as Madere Island, which is used by our enemies as a point of support, so that the zone will be bounded as follows: From point $44^{\circ} 0' N.$, $34^{\circ} 0' W.$, to point $42^{\circ} 30' N.$, $37^{\circ} 0' W.$, to the point $37^{\circ} 0' N.$, $37^{\circ} 0' W.$, to point $30^{\circ} 0' N.$, $27^{\circ} 0' W.$, to the point $30^{\circ} 0' N.$, $17^{\circ} 0' W.$, to the point $34^{\circ} 0' N.$, $12^{\circ} 0' W.$, to the point $36^{\circ} 45' N.$, $12^{\circ} 0' W.$, and back to the starting point.

"Neutral vessels which at the time of publication of this declaration happen to be in ports within the new blockade zone may yet leave those ports without coming under the military measures ordered for that zone if they can leave before or on January 18, 1918, and take the shortest route to the free regions. Sufficient time has been allowed so that neutral vessels that may enter the new blockaded zone without having a knowledge of the present declaration or unable to gain such knowledge be spared.

"It is earnestly recommended that neutral shipping be cautioned and warned off the blockade zone."

Berlin, January 5, 1918.—*Official Bulletin*, 31/1.

HUNTING U-BOATS 300 MILES AT SEA.—*Commander Taussig, Who Took Over First Squadron of Our Destroyers, Tells of Hazardous Work.—A Hard Bird to Catch.—Advantage Over Surface Craft is Difficult to Overcome, but Destroyers are the Best Weapon.*—More destroyers as the surest defence against the submarine are recommended by Commander J. K. Taussig, U. S. N., who commanded the first squadron of American destroyers that joined the British patrol vessels in Irish waters after the United States entered the war. Commander Taussig made this statement in an address delivered at the recent war thrift meeting in Carnegie Hall, and gave a picture of the routine of patrol work and the difficulty of actually getting at particular submarines.

That actual destruction of enemy submersibles, a comparatively infrequent feat, is only a part of the work of protecting the merchant marine was evident from Commander Taussig's statements. In seven months, he said, his own destroyer got a chance to fire at a submarine only once. With depth bombs, he said, he thought he had damaged one or two, but could not be sure he had sunk any. And yet in convoy and patrol work his vessel, and those associated with it, did extremely valuable work in the protection of the lanes of traffic.

"When the United States became a belligerent last April," he said, "one of the first requests the Allies made was that we send as many destroyers and other patrol boats as we could possibly muster over to the other side to assist them in combating the submarines. At 9.30 one April night I received orders to proceed at daylight to my home navy yard to fit out for distant service. What was before us I did not know. There were five other commanding officers of destroyers who received the same orders, and at 5 o'clock the following morning we left Chesapeake Bay and were on our way to New York and Boston at a high speed, in order that we might get ready as soon as possible for whatever it was to be.

"So anxious was the Navy Department that the outside world in general know nothing of the movement of these ships that not even I, who was in command of the expedition, was informed of our destination. We went to the navy yards, the ships went in dock, had their bottoms cleaned, painted; we took on stores and provisions to last three months, and in a few days sailed from Boston. My orders were to proceed to a point 50 miles east of Cap Cod, and then open my sealed instructions. Until I got to that point, at midnight of the first night out, I did not know that our first port of call was to be Queenstown, Ireland.

"It is quite natural that the few in authority who knew of our movements watched with anxiety for news of our crossing. It was the first time that vessels of this type had ever made so long a continuous passage without refueling or without the company of larger vessels. We were 10 days in making the trip, due mostly to a southeast gale, which accompanied us for 7 of the 10 days. So rough was the sea during this time that for 7 of the 10 days we did not set our mess tables; we ate off our laps. On the ninth day we were pleased to be met by a little British destroyer named the *Mary Rose*. She picked us up early one morning and came along flying the international signal, 'Welcome to the American Colors.'

"To this I replied, 'Thank you, we are glad of your company.' The little *Mary Rose* then accompanied us to Queenstown. I am sorry to say that three months later the *Mary Rose* was sunk with all hands by a German raider in the North Sea. We received a very hearty welcome at Queenstown by the British Admiral, Sir Lewis Bailey, and by the others in authority there. They were very glad to see us.

"Things were looking black. In the three previous weeks the submarines had sunk 152 British merchant ships. It was manifest that this thing could not go on if the Allies were to win the war. The British admiral gave us some wholesome advice in regard how best to fight the submarines. We immediately prepared for this service by having what are known as depth charges or depth bombs installed. We put ashore all of our surplus stores and provisions in order to lighten our draft, as it was possible that a few inches might save us from striking a mine.

"The seriousness of the work before us was made very evident, not only by the large vessels that were being sunk, but by the fact that the night before we entered the harbor a German submarine had planted 12 mines right in the channel. Fortunately for us, they were swept up by the ever-vigilant British mine sweepers before we arrived. The day following our arrival one of the British gunboats from our station was torpedoed and her captain and 40 of her crew were lost.

"Patrol vessels were continually bringing in the survivors from the various ships as they were sunk. The British admiral told us that we would go on patrol duty for six days at a time, and then come in for two or three days' rest. In this patrol duty we were assigned to certain areas, as far as 300 miles off shore, as the submarines were then operating that far out. Our orders were first to destroy submarines, second to escort our convoy valuable merchant ships; third, to save lives if we could. We did escort many ships, and we did save many lives.

"I cannot say that we sank many submarines. The submarine, I found, was a very difficult bird to catch. He has tremendous advantage over the surface craft. In the first place, he always sees you first. First, because when on the surface he is very low, and when submerged he has only his periscope out, or perhaps nothing at all. As he was not after destroyers, he avoided us whenever he could. That is, if he saw the destroyer on the horizon, the submarine immediately went the other way.

"When we saw a submarine, which sometimes happened frequently, and at other times several weeks might pass without seeing one, we would immediately go after him full speed, and open fire with our guns in the hopes of getting in a shot before he submerged, but he always submerged very quickly. Only once did my vessel in seven months succeed in actually firing at a submarine. He then went down after the fifth shot was fired. At that time he was 5 miles away. But what they are afraid of are the depth charges or depth bombs.

"I will tell you how they operate. A depth charge is about two or three hundred pounds of a high explosive. It is fitted so as to explode automatically at any depth we may desire. The destroyers and patrol vessels carry them on deck at the stern. When we see a submarine submerge we try to find his wake, and if we can see the wake of a submerged vessel we run over it, drop the depth charge by simply pulling a lever, and in a few seconds there is a terrific explosion.

"This explosion is so great that on one or two occasions, when I happened to be in the chart house when they let go, I thought my own ship was torpedoed. They can be felt under water for a distance of several miles, but of course they must be dropped very close to the submarine in order to destroy him. If we get it say within 90 feet of the hull, it may damage it enough to cause him to sink, otherwise only superficial damage may result.

"I cannot say positively that I sank any submarines. I saw results on several occasions which led me to believe that I had at least damaged one or two.

"The patrol duty was very trying, as the ocean was strewn with wreckage for a distance of 300 miles off shore. It was hard to tell a periscope when we saw one. Fish, floating spars, and many other objects were taken for periscopes and fired at; we could not afford to take a chance, as our whole safety depended on our being vigilant.

"The submarines became less active—I won't say they became less active, but they did less damage as the summer wore on, due, undoubtedly, to having more patrol vessels.

"Then the scheme was taken up of having convoys. The advantage of a convoy is that 6 or 10 destroyers can protect from 20 to 30 merchant ships, while in the patrol system only one destroyer could be with one merchant ship at a time. The convoy system has now developed so that practically all vessels passing through the danger zone are in large convoys of from 10 to 30, with an escort of from 6 to 10 destroyers.

"These convoy trips would take us out of port from six to eight days. They were very trying days, especially during the latter part of the fall, when the weather got bad. When we are at sea in this way we do not take off our clothes, neither officer nor man. We must be ready at all times. We do not even have the pleasure of taking a bath, as something might happen and you would not be ready for it. As one young officer expressed it, we had to come down to the Saturday night bath habit, and if we happened to be at sea Saturday night we might be out of luck.

"The night work was very difficult, as the danger of collision was great, with so many ships without lights operating in close proximity. There are frequent collisions, and we must use our judgment as to whether we should turn on our lights and avoid the danger of collisions, and take the risk of a submarine seeing us, or keeping our lights out and taking our chances. We have this to remember, that if a submarine sinks us, she only sinks one ship, but a serious collision may result in the sinking of two ships, so it is a matter of judgment.

"The question is, can we beat the submarine? I am sure we can if the people will do their part. We now have enough destroyers, or almost enough, to make the convoy system successful. We want more destroyers in order that we can have a patrol in addition to the convoy. When we convoy we are on the defensive, we do not see the submarine unless it comes to us, but when we are on the patrol we are on the offensive, we go out and look for them, and we hound them until we destroy them or drive them out of the area. So we must have enough for both."—*N. Y. Times*, 3/2.

NORTH SEA AND CHANNEL

COLLISION SINKS GUNBOAT IN CHANNEL.—The British torpedo gunboat *Hazard* was sunk in the English Channel on January 28 as the result of a collision, the Admiralty announced. Three men were lost.

[The torpedo gunboat *Hazard* was built in 1894 and measured 1079 tons. She was 250 feet long and her normal complement was 115 men.]—*N. Y. Herald*, 31/1

BERLIN REPORTS NAVAL ATTACKS ON OSTEND.—Ostend, on the Belgian coast, has been bombarded by naval forces, it is announced in army headquarters' report.—*Evening Star*, 21/1.

GERMAN MINES SINK OWN DESTROYERS.—The mine field responsible for the sinking of the German destroyers *A-73* and *A-79* was of German origin. The 17 men from the crew of the *A-79*, the only survivors from the two vessels, suffered greatly four days in the open sea. It was from these survivors it was learned the mine field was German.—*N. Y. Herald*, 26/1.

WIDEN PROHIBITED ZONE IN NORTH SEA.—Notice of the alteration of the prohibited zone in the Irish and North Sea channels issued by the British Admiralty was transmitted to the State Department by the American Consul General in London. Navigation is now forbidden to all vessels in the area bounded on the northwest by a line joining latitude 56 degrees, 22½ minutes north, longitude 6 degrees, 17 minutes west, and latitude 55 degrees, 31 minutes north, longitude 6 degrees, 2 minutes west, bounded on the southeast by a line joining latitude 55 degrees, 13½ minutes north, longitude 5 degrees, 30 minutes west, and latitude 55 degrees, 2 minutes north, longitude 5 degrees, 40½ minutes west, bounded on the southwest by a line joining first and fourth points, bounded on the northeast by a line joining second and third points.—*N. Y. Herald*, 5/2.

FIGHTING U-BOATS FROM TOWED KITE BALLOONS.—Among other agencies brought to bear on the German submarines is the kite balloon of the type so extensively employed on the fighting fronts. The French Navy, in particular, is employing a number of kite balloons with tenders for the purpose of spotting U-boats lurking near the coast and at the entrances to important harbors. The life of the kite observer at sea is full of thrills, especially during those times when he climbs up to the balloon swinging above the trawler and when he slides down the ropes to the deck of the trawler. It is said of these kite observers that some of their feats in this connection would compare most favorably with those of a trained tight-rope walker. But once in the basket of the balloon, the work is devoid of that excitement which is part and parcel of the work of the land observer. The U-boat can be readily spotted from a height of a few hundred feet, even when they are below the surface of the water, provided the sea is not too choppy and the light conditions are favorable.—*Scientific American*.

SEA YIELDS UP GERMAN DEAD.—Belief that a naval engagement has occurred is expressed in a dispatch received in Stockholm from Gothenburg and forwarded by the correspondent of the *Morning Post*. The dispatch reports the recovery of a large number of bodies of German sailors, who apparently belonged to a warship.

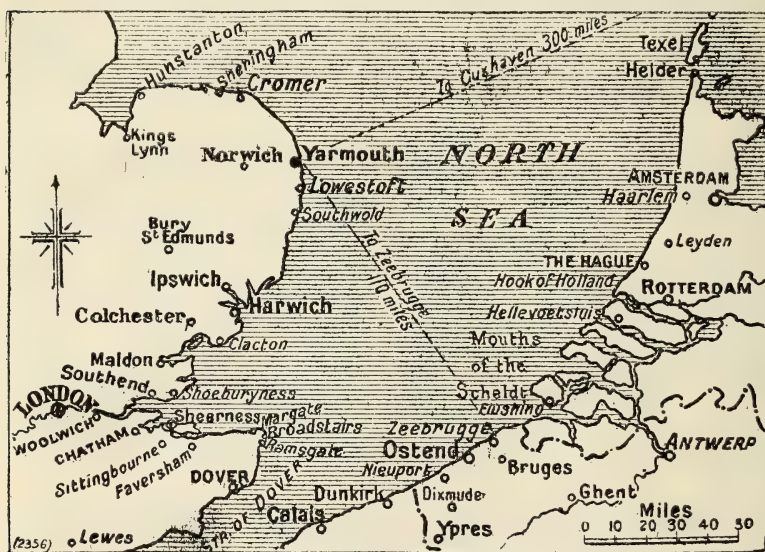
Gothenburg is on the western coast of Sweden, and is near the Skagerrak, one of the bodies of water connecting the North and the Baltic seas and the one nearest the North Sea. The North Sea in the vicinity of the Skagerrak has been the scene of previous naval engagements, the great battle of Jutland having been fought there.—*Washington Post*, 17/2.

THE THIRD ATTACK ON YARMOUTH.—Yarmouth, January 15.—Yarmouth, which was bombarded in November, 1914, and again at Easter, 1916, was made the target of enemy guns for the third time last night. It is not known whether a destroyer or a submarine made this last attack, which opened at 11 o'clock when a star shell lit up the town. A fusillade of shells followed, and swept the town for about five minutes, after which the raider vanished. Many of the inhabitants were in bed, and others were at supper, while some were making their way home from picture theatres. People who were out state that they heard the whistle of the shells overhead, and saw glares in the sky as the explosions occurred.

Four deaths have been reported. One person was killed and another severely wounded in one house by a bursting shell. A man and his wife are two other victims, and a sailor was killed on board a steamer in the harbor. Other casualties occurred, some persons being severely, and others only slightly, injured.

One shell wrecked the frontages of several houses and shops. The roofs of some houses were carried away, and the fronts of other premises were destroyed. A doctor's house was badly knocked about, while concussion caused by the exploding shells caused other damage to property. On the whole the damage was not great. Houses were filled with brickwork, stoves were blown out, doors wrenched from their hinges, and much window glass was broken. Many persons had remarkable escapes. One room was wrecked, but the child sleeping in a cot escaped without a scratch. Everything happened so quickly that all the damage had been done before people realized what was happening.

The inquest will be held to-morrow.



THE ATTACK ON YARMOUTH.

The Raid: A Comparison.—The accounts of the British raid on Karlsruhe and the German raid on Yarmouth contain instructive points of contrast. The former was presumably in the nature of a reprisal, and it may be recalled that the bombardment of Whitehaven by a submarine in August, 1915, was said to be a reprisal for the shelling of a Turkish troop train by a British submarine in the sea of Marmora. But in every other sense, what a difference! The British airmen attacked in broad daylight, selecting as targets for their bombs railway junctions, munition works, and other establishments, all of military value. They also waited after the job was done in order to obtain photographic confirmation of the destruction wrought. The place they attacked was defended both by anti-aircraft armament and by aeroplanes.

Compare these details with those of the attack on Yarmouth. It occurred on one of the darkest nights of the winter, and the raider hurried off in haste after he had thrown a few shells into the town. No damage was, or could have been, done which is likely to have any influence on the progress of the war. This business was pure devilry. There is no real menace to the security of our shores from such attacks, which from a naval or military point of view are singularly futile. That the raider was a sub-

marine is most probable, for a formation of destroyers or a squadron of light cruisers would have carried out a heavier bombardment. There is, indeed, a close resemblance in this case to those of Seaham, Southwold, and Scarborough. The object of the enemy is to maintain the fiction that our control of the North Sea is in dispute, and to produce a pleasing spectacular effect for German eyes, which acts as a set-off to disasters elsewhere. Funchal, in Madeira, and Bayonne, in the Bay of Biscay, are other places which have been subjected to the same kind of wanton outrage.—*London Times*, 10/1.

MEDITERRANEAN

BRITISH CRAFT SUNK IN MEDITERRANEAN.—The transport and the fleet auxiliary which were sunk early this month in the Mediterranean, as announced in the House of Commons last week, were the *Aragon* and the *Osmanieh*.

The British steamship *Aragon*, 9588 tons gross and 513 feet long, was built in Belfast in 1905 and was operated by the Royal Mail Steam Packet Company of Belfast before being taken over by the British Admiralty. The British steamship *Osmanieh*, 4041 tons gross and 360 feet long, was built in 1906 and owned in London.—*N. Y. Herald*, 31/1.

SUNK A DUMMY CRUISER.—*U-Boat in the Mediterranean Neglected a Convoy to Attack it.*—Apropos of the story printed in the *New York Times*, of the exploits of the British dummy naval vessels, which has been republished here and read with much amusement and interest, Reuter's Agency is informed of one authenticated case of a valuable convoy proceeding to the Dardanelles, followed by a "cruiser."

A German submarine that was in the neighborhood allowed the convoy to pass and reserved its energies for the "cruiser." The Germans must have been greatly surprised when they saw the big guns from the supposed warship floating away from the wreck.—*London Times*.

BRITISH AND TURKISH SEA ACTIONS.—In an action between British and Turkish warships on the morning of January 20, at the entrance to the Dardanelles, the Turks lost one of their most effective warships, with the chances that the fine battle cruiser *Sultan Yavuz Selim*, formerly the *Goeben* of the German Navy, may also prove a total loss. The armored cruiser *Midilli*, formerly the *Breslau* of the German Navy, was the vessel lost. Both of the Turkish warships were manned by Germans, and they only had opposed to them two old monitors and two destroyers and some seaplanes. The British lost the monitor *Raglan* and the small monitor *M-28*, which, so far as vessels go, are minor losses. The *Sultan Yavuz Selim* was so badly damaged by a mine that she had to be run ashore at Nagara Point, in the narrows of the straits. She has been further bombed by British aircraft and may yet prove a total loss. The *Midilli* was sunk by striking a mine after being driven by British destroyers during the fight into a British mine field. Turkish destroyers attempting to go to her rescue were driven off by British destroyers, and the British rescued 172 Germans of the *Midilli*. Her complement was 373. Of the total men on the two British ships 132 were saved; 220 men perished. The *Sultan Selim* and the *Midilli*, the British Admiralty explains, had emerged from the Dardanelles to attack British naval forces north of the island of Imbros. After the *Raglan* and *M-28* were sunk the *Midilli* went to the bottom, and the *Sultan Selim* to escape then headed toward the Dardanelles at full speed and struck the mine. The British Admiralty reported on January 23 that the bombing attacks on the *Sultan Selim* were being continued, and that two hits with heavy bombs had been made.

The Turkish official report of the action says: "In a clever attack the cruisers *Sultan Selim* and *Midilli*, with some torpedo-boats, issued from the Dardanelles January 20 in order to destroy enemy forces which had been located near the island of Imbros. Two enemy monitors, the *Raglan*, 4500 tons, with two 14-inch guns and the *M-28*, 500 tons, with one 9-inch gun,

and another smaller gun; a transport ship of 2000 tons, a signal station and numerous munition depots were destroyed. There was lively aerial activity on both sides. An enemy airplane was shot down in an aerial fight, and a second was seriously damaged. Our coast batteries successfully bombarded enemy torpedo-boats. On the return trip the *Midilli* was sunk by striking several mines."

The *Sultan Selim* was a sister ship to the *Moltke*, and was completed in 1912. She was a 28-knot ship, had a length of 610¼ feet and a displacement of 22,640 tons. She used both coal and oil in her furnaces. Her main battery was ten 11-inch guns and she was provided with two torpedo tubes. She had side armor of 11 inches and armored decks of 3 inches. Her complement was 1025 officers and men. She and the *Midilli* were nominally purchased from Germany in August, 1914, but the sale is held to have been entirely spurious. Both vessels successfully eluded the Allied warships on the watch for them in the Mediterranean and reached a Turkish port safely.

The *Midilli* was completed at Stettin in April, 1912, and her best speed on an hour's run was 27.55 knots. Her length over all was 446 feet and her normal displacement was 4550 tons. She had an armor belt amidships of 3½ inches, an armored deck of 2 inches and carried twelve 4.1-inch guns and had two torpedo tubes. She burned both coal and oil.

Both ships have been very active in the Black Sea and have been reported in Russian dispatches as sunk or seriously injured on several occasions. A British official report told of dropping bombs on the *Sultan Selim* in July, 1917, with the result, it was said, that her injuries would keep her in port several months. Her inactivity since that time would indicate the correctness of this last report.

The Turkish Navy has suffered heavily during the war. The known losses are: Two battleships, two protected cruisers, ten gunboats, two torpedo-boat destroyers, three torpedo-boats and twenty-three supply ships and transports.—*Army and Navy Journal*, 26/1.

AIRMEN CONTINUE "GOEBEN" ATTACKS.—London, Wednesday.—Several attacks by day and night have been made by British naval airplanes on the cruiser *Goeben*, stranded in the Dardanelles, and two hits with heavy bombs were made, it was officially announced to-day. The announcement reads:

"Naval air service machines have made several day and night attacks on the *Goeben* and secured two hits with heavy bombs. They have also bombed one of the tugs which is secured alongside the *Goeben*. In every case heavy anti-aircraft gunfire was encountered, but all our machines returned safely.

"The attacks are continuing."—*N. Y. Herald*, 24/1.

The *Goeben* was floated and reached port.

PACIFIC

THE JAPANESE AT VLADIVOSTOCK.—No official announcement has been made with regard to this new development in the Far East. The only people who criticize it adversely are those who think that Germany will be sooner moved to practical repentance by the Allies assuming that she is a civilized nation than by teaching her that she is not one in the way she understands—that is to say, by force. That Japan's occupation of Vladivostock may not square with the letter of Allied professions may be true enough; but it certainly squares with their spirit, which, after all, is the chief thing. As for the contention that Russia is our ally, and that Japan by this action is violating the obligations of partnership, it is as if when a man's house is on fire his friends should refrain from saving as many of his goods as they could in case he might misconstrue their help. At present Russia is voiceless, except on a note that no one cares to hear except the enemy. Japan wisely cuts the far-fetched considerations of the "defeatists," and keeps guard in Vladivostock. She has several good reasons,

all of which are understood by the Allies. One is that the port is the Pacific terminus of the trans-Siberian railway, and as such is a great depot for vast quantities of munitions and other war material supplied by Britain, France and the United States for the use of Russia's armies. As the Bolshevik caricature of a government knows why they are not performing their share in the war, it cannot be permitted to inflict further loss upon the Allies by disposing of the war material at Vladivostok. Again, there is a large internment camp in the vicinity, the prisoners in which must not be permitted to escape. That Vladivostok may be turned into a base for enemy raiders and submarines in the Western Pacific is, too, a contingency, however remote, which must be provided against, and Japan is doing it in the only way possible. How could the situation be met in any other way?—*Army and Navy Gazette*, 22/12.

MORE ENTENTE WARSHIPS ARRIVE AT VLADIVOSTOK.—Five more Entente warships have arrived at Vladivostok, according to special dispatches from Petrograd. It is added that China, acting on allied advice, has forbidden exportation of foodstuffs to Russia.

The British embassy in Petrograd January 26 informed the Bolshevik Government that British warships were at Vladivostok to protect Allied subjects against possible disorder.—*Evening Star*, 1/2.

JAPANESE TROOPS LAND AT VLADIVOSTOK.—The *Naschivek*, formerly the *Retop*, asserts that a Japanese cruiser at Vladivostok has put troops ashore and that the Japanese consul there has issued a proclamation declaring that the Japanese soldiers are to keep order, owing to the danger threatening Japanese citizens. The proclamation of the consul adds that the soldiers have no other motives and no desire to interfere in Russian affairs.—*Evening Star*, 19/1.

CHINESE FIRE UPON GUNBOAT "MONOCACY."—The American gunboat *Monocacy* was fired upon by the Chinese 50 miles above Yochow, on the Yang-tse-Kiang. A sailor named O'Brien was killed and two other sailors were wounded.

The attack was made near Kien-Lih-Sien and came without warning. The attackers hid behind a dike on the north bank of the Yang-tse-Kiang. The gunboat returned the fire but with what result is not known. Afterward the *Monocacy* proceeded to Hankow.

The firing lasted for half an hour. It is presumed that the assailants were a detachment of the southern revolutionary forces.

The reason for the attack and details of it have not yet been received. Dr. Paul S. Reinsch, the American ambassador, will demand of the foreign office that responsibility for the attack be fixed and the offenders punished, and also that measures shall be taken to safeguard shipping. Dr. Reinsch does not believe that the attack indicates an anti-foreign feeling, but rather that it was intended to bring up complications for the central government.

The Japanese steamer *Tayuen* also was subjected to fusillades.

The commander of the American gunboat fired upon by Chinese rebels reported that he returned the fire and silenced it.

American Minister Reinsch's dispatches to the State Department to-day bearing on the attack on the *Monocacy*, contained no additional details to those already received in press dispatches. Minister Reinsch said he had already made representations to the Chinese Government.

Secretary Daniels gave out the following:

"On January 17, at 9 a. m., the United States gunboat *Monocacy*, while cruising about 50 miles above Yochow, on the Yang-tse-Kiang River, was fired on by intrenched Chinese, and was hit a number of times. H. L. O'Brien, chief yeoman, was fatally injured, and W. N. Donnelly, seaman, slightly wounded. The fire was returned by the *Monocacy* and silenced.

"It is believed that the Chinese were bandits or revolutionists."—*Evening Star*, 22/1.

GENERAL NOTES

U-BOATS HAVE SUNK OVER 6,000,000 TONS.—*End of Year of German Frightfulness at Sea Shows Britain the Heaviest Loser.—Norway Leads Neutrals.—America's Loss Put at 69 Ships in the 12 Months of German Attack.*—A year ago the German Government decreed unrestricted submarine warfare against enemy and neutral merchant vessels. The decree read:

"From Feb. 1, 1917, sea traffic will be stopped with every available weapon and without further notice."

The danger zone around the British Isles, established in February, 1915, was enlarged and made to include the western Mediterranean. A prohibited zone was also established for hospital ships on the ground of the alleged misuse of these ships by the Allies.

The decree repudiated Germany's note to the United States of May 4, 1916, in which she promised henceforth to conduct her submarine campaign in accordance with the laws of nations—search and capture, and sinking only when the presence of contraband aboard had been proved and there was no opportunity to take the vessel to a home port and the safety of the personnel had been assured.

According to figures in the following tables, which are official unless otherwise designated, the total of tonnage lost of Allies and neutrals from January 1, 1917 to January 26, 1918, was 6,617,000 while in the same period (all official accounts either begin with the last week of February or combine January and February), the total number of British ships, exclusive of fishing craft, was 1169.

TONNAGE LOST BY ALLIES AND NEUTRALS

Month	
January 1 to February 25, 1917.....	812,000
March	600,000
April	788,000
May	549,000
June	758,000
July	463,000
August	591,000
September	*455,000
October	*470,000
November	*435,000
December	*388,000
To January 26, 1918.....	*308,000
Total	6,617,000

BRITISH LOSSES IN SHIPS

	Number ships
January 1 to February 25, 1917.....	140
Four weeks March	93
Five weeks April	185
Four weeks May	113
Five weeks June	110
Four weeks July	81
Five weeks August	104
Four weeks September	73
Five weeks October	87
Four weeks November	61
Four weeks December	70
To January 26, 1918	52
Total	1,169

* Estimated.

Aside from the belligerent, Great Britain, with a loss of 1169 ships, exclusive of fishing craft, Norway, a neutral, has been the heaviest loser.

On January 4, a Copenhagen dispatch announced that in 1917 Norwegian vessels with an aggregate tonnage of 566,000 were sunk. According to figures kept in the *Times* office 69 merchant vessels flying the American flag were also sunk in the same period.

The exact number of submarines which came to grief in their unrestricted campaign is not known, but, according to the State Department, the average sinkings of them for the first 11 months were 1.25 a day, or about 38 a month, while the German rate of construction had been .75 a day, or about 23 a month.

The visible falling off in the work of the submarine during the last three months is accounted for in three ways, each backed up by authoritative and sometimes official conjecture: That the protection offered convoys was growing more adequate; that the engines against the submarine were becoming more effective, particularly the "depth charge"; that many of the super-U-boats had been withdrawn either for refitting or on account of the debilitation of both officers and men.

It has been reported that mutinies at German naval bases have been caused by the enforced draft of men for submarine work. There is also the report that Germany is harboring her submarine strength for a monstrous campaign against American shipping, bearing troops and supplies abroad. Secretary Baker on January 27 predicted such a campaign in the words:

"The most powerful submarine offensive hitherto undertaken may be expected."

With the reason given for the recent falling off in sinkings by U-boats, the requisitioning by the government of 426 ships, totaling more than week in June the total of British entrances and clearances reached the maximum for the year—28,204 ships. This figure has dropped steadily until the week of January 26, when the total was 4661. In the first week designated 130 British ships were sunk; in the second, only 21.

A dispatch from France on January 29 stated that 16 former German vessels, including the *Leviathan* (*Vaterland*) had just landed supplies and men in that country. By taking over German ships the United States has added 515,435 tons to her flag. A further offset to the Allies' loss of tonnage is the requisitioning by the government of 426 ships, totaling more than 2,000,000 gross tons, while contracts have been awarded for 884 ships.

Great Britain had in commission in August, 1914, 16,841,919 tons. She has added to this by construction: In 1915, 1,386,914; in 1916, 2,050,000; in 1917, 2,850,000, and by purchase during the whole foregoing period 80,000 tons, giving a net total of 23,208,433 tons. Of this it has been estimated that she has lost from all causes since the war began 9,116,914 tons, which should leave her in possession to-day of 14,091,514 tons which is only 2,750,000 tons less than what she had when the war began.

Sir Eric Geddes, the First Lord of the British Admiralty, announced in July that Great Britain had 15,000,000 tons afloat, and that the empire's building for the year would be over 2,800,000. Of the 6,000,000 tons contracted for by the United States, it was reported in Washington on January 13 that 327,150 tons requisitioned while under construction would be put into service before the end of March.—*N. Y. Times*, 2/1.

69 OF OUR SHIPS SUNK; 300 DROWNED.—*Official Record of a Year's Experience with German "Frightfulness."*—*Net Gain of 515,435 Tons by Seizure of German Craft—426 More Ships Requisitioned and 884 Are Being Built.*—In the 12 months of unrestricted warfare launched against American and allied shipping by Germany one year ago there have been sunk by submarines, mines and raiders 69 American vessels, totaling 171,061 gross tons, according to a careful compilation of records of sinkings which have been made public in the period.

Offsetting this loss of American vessels, most of which were sailing ships, the United States since February 1 has added to her merchant

marine by the seizure of former German and Austrian owned ships a total of 107 vessels having a gross tonnage of 686,494, leaving on the credit side of the American ledger in the account with the Central Powers a net gain of 515,435 gross tons. The loss of life caused by the sinking of the 69 American ships was more than 300 persons, however.

The percentage of sinkings of American ships compared with the number of vessels which have sailed through the war zone successfully is small. Records of the Department of Commerce show that for the period beginning February 1, 1917, and ended December 1, there were cleared from American ports in the foreign trade ships aggregating 17,738,900 tons net, or approximately 24,834,400 gross tons. The number of ships making up the total of tons was not made public by the department.

Further offsetting the loss of tonnage occasioned by the submarine warfare, the United States through the Shipping Board requisitioned in American shipyards 426 vessels totaling more than 2,000,000 gross tons, and contracts have been awarded for 884 ships, a large number of which are now under way and are being rushed to completion. In addition, the Shipping Board on October 15 last placed under government requisition 393 American vessels of more than 2500 tons deadweight capacity, which were afloat and immediately assigned them to the task of carrying supplies for the Allies and the American forces abroad.

Including in these requisitioned vessels were 21 ships in Great Lakes trade and in addition there were commandeered 24 steamers building on the lakes for a foreign account and ready for launching. Virtually all of these were brought to Atlantic coast ports and immediately put into service. Almost one-half of them had to be cut in two to get them through the Welland Canal, but the task was accomplished and the ships rejoined in less than three months from the time the contract was awarded.

Another difficulty which faced the United States in the task of putting to sea vessels to offset the ravages of the U-boats was the repairing of the "willful damage" done to the former German ships by their officers and crews before the ships were seized. This cost millions of dollars, and in many instances called for the highest engineering skill to make and replace parts of foreign-built engines and boilers removed or broken.

Indicating that the task has been attended by success, the statement was made to-day by a prominent official connected with the Shipping Board that every seized vessel was now completely repaired and in service. Many of them have made three and four round trips through the war zone.

Three of the former German vessels have been the objects of successful attack by the submarines. The *Actaeon*, formerly the *Adamsturm*, and the *Owasco*, formerly the *Allemania*, were sunk and the *Armenia* was hit by a torpedo but was saved after being beached. Several other former German ships have been attacked, but escaped.

The announced sinkings of British ships for the year up to and including the week ended January 23 have been 1033 vessels, of which 763 were of more than 1000 tons, and 270 were under that figure. The joint losses of France and Italy have averaged three to four large vessels weekly.—*Washington Evening Star*, 2/1.

ASSERT SUBMARINES SANK 9,000,000 TONS.—The German newspapers assert that in the first year of the unrestricted submarine warfare 9,000,000 tons of Allied and neutral shipping were sunk, and that only 4,000,000 tons have been built to offset this.

As showing how unreliable is the information which the German authorities give out, the Associated Press is authorized to state that the figures put forward exaggerated the actual tonnage lost by more than 50 per cent.

The total net loss of the world's ocean-going tonnage since the beginning of the war, including the losses by marine risk as well as by enemy action, and allowing for enemy tonnage captured, amounts to less than 3,000,000, or 9 per cent of the tonnage available at the beginning of the war.

The semi-official *Norddeutsche Allgemeine Zeitung* and other Berlin newspapers publish articles on the anniversary of unrestricted submarine warfare. They glorify the U-boat as a "weapon which has achieved strategic and moral results, particularly against Great Britain in its world position."—*N. Y. Times*, 3/2.

THE SUBMARINE WAR.—*Secretary Daniels Expects a Continuing Fight, With Losses to Both Sides*.—Washington, January 28.—Prospects of concentrated effort on the part of German submarines to break down the transatlantic line of communication to the American expeditionary forces predicted to-day in the weekly review of the War Department has been foreseen also, but navy officials, it was learned to-night, believe the imminent offensive to be only the usual activities which has always succeeded a lull in submarine warfare.

Secretary Daniels, in reply to questions, said to-day that the navy expects a "continuing fight" with the submarines, with losses to both sides expected. He expressed the belief, however, that new weapons now in use will make such operations increasingly costly to the German Admiralty.—*Baltimore American*, 29/1.

THIRD OF U-BOATS LOST IN 10 MONTHS.—*Germans Fear Depth Bombs, Says Engineer from Kiel*.—Geneva, Switzerland, February 16.—A Swiss engineer employed for the last 10 months at the electrical works at Kiel and who has recently returned, informs the Associated Press that the Germans are making every effort to conceal their submarine losses, especially from the navy, because of increased difficulty in mustering crews. He estimates the Germans lost 30 per cent of their submarines during the time that he was at Kiel.

"I saw a score of submarines lined up in the canal undergoing repairs," he said. "They had been hit by depth bombs, which the Germans seem to fear greatly."

The engineer added that there had been two serious mutinies at Kiel during 1917.—*Washington Post*, 17/2.

U-BOATS SUNK AS FAST AS GERMANY CAN BUILD THEM.—*Back from the Front, Representative Miller Makes Encouraging Report to House*.—Washington, D. C., Tuesday.—Representative Miller, who recently went to the front in France, told the House to-day that he believed German submarines are being destroyed nearly as rapidly as Germany can build them.

He praised Vice Admiral Sims for the methods he had adopted with American destroyers and cruiser convoys to combat the submarine menace, and argued that American shipping should be handled by naval officers and not by the Shipping Board. There were no Americans in the crews of the two transports aboard which he crossed the Atlantic, he said.

Mr. Miller said that during the last 10 months three times as many submarines have been destroyed as were destroyed during the previous two and a half years.—*N. Y. Herald*, 6/2.

ONLY 30 U-BOATS NOW IN WAR ZONE.—A correspondent of the Associated Press, recently returned from Europe, is authority for the statement that the number of German submarines operating in the prohibited zone had until recently been surprisingly small.

During the early period of the winter the number of submarine raiders at work in the zone varied from 12 to a maximum of 18. It was then expected, however, that the Germans would endeavor to increase this number, largely as a threat to the American troop transports, and that they might by this time be able to increase this maximum perhaps to 30 boats. These estimates do not include the smaller "egg planters" or mine-laying submarines.

The most formidable German submarines of which there is any definite record were armed with the new German 15-centimeter (5.9 inches) gun brought out in the war, which is a more powerful, longer-ranged gun than the 15-centimeter gun mounted in the main batteries of the German light cruisers at the outbreak of the war. The newest submarines carried two of these guns, forward and aft.

Much has been heard in the press, neutral and belligerent, of giant 5000-ton "submersible cruisers," but none of these had been identified definitely, according to the latest information in possession of the correspondent, nor had there been any trustworthy news from Germany that the Admiralty was laying down any boats of a tonnage representing such a jump from the size of the most modern submarine operating in the late summer and autumn.

The numerical production of submarines in Germany at that time had fallen off decidedly, due in part perhaps to difficulties with raw material, but chiefly to a decision to suspend the manufacture of small submarines of the "canal" type.

These boats, small enough to proceed to the sea through the canals of Belgium, had been built in comparatively large numbers in series production all over Germany and shipped to salt water, but were found to be too small for effective use under present conditions in the war zone, where destroyers and armed patrol boats compel the representatives of ruthlessness to operate chiefly submerged and to carry armament heavy enough to outrange the light guns on the armed merchantmen.

German experts believed, in fact, that a serious mistake had been made in designing and constructing these craft.—*Nautical Gazette*, 14/2.

DISCONTENT IN GERMAN FLEET.—London, January 25.—A German naval engineer with the rank of lieutenant, who has deserted from Kiel, according to an Amsterdam dispatch to the *Daily Express*, states that dissatisfaction among the men of the German fleet is much more serious than in the army. He asserts there have been important revolts, generally among the crews of mine sweepers.

Three weeks ago a squadron of mine sweeping trawlers entered Hamburg after an expedition in which three men were lost in an encounter with the British, and one of the trawlers was damaged. Before the men were permitted to go ashore, according to this account, they were notified that they must report back for duty within an hour. They asked time for rest. The Hamburg commandant refused, whereupon 150 men declined to obey the order.

An hour later a lieutenant named Wagner arrived and ordered the men to return to their boats. They refused. The lieutenant swore at the men and struck two of them, the dispatch continues. He was thrown into the water and left to drown.

The commandant who had watched the mutiny dispatched a motorboat carrying two machine guns which were fired into the crowd of sailors, killing 44 and wounding 73. The others were arrested and sentenced to terms of imprisonment varying from 5 to 20 years.—*Washington Evening Star*, 28/1.

THE GERMAN REVOLT.—It is undoubtedly premature to look for the collapse of the German military program because of the internal troubles now prevalent in the empire. Strikers may have quit work by the hundreds of thousands, tying up important industries and spreading disaffection among the people. But the German Government is not impotent to cope with such a strain. It still has the army at command to put down revolt and it will probably do so.

Indeed, it would not be desirable, from the point of view of the Allied nations, for the present strikes to bring the German Government to the point of peacemaking. There is in this outbreak of discontent not yet

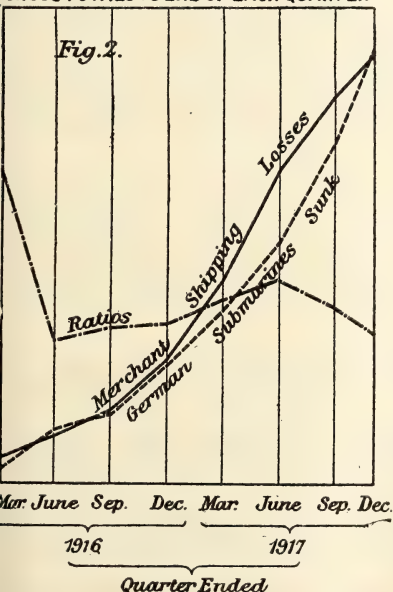
a symptom of revolution against the dynastic rule, no protest against the mode of autocratic government. Not until the German people are at the point of refusal to follow longer the lead of irresponsible rulers will the spirit of conquest that is the root of the evil of to-day be broken.

Repression by force of arms may come in Germany in the immediate crisis. In one respect it is to be hoped for by the enemies of Germany. For repression will not allay the sentiment for peace and bring alleviation of intolerable conditions. It will merely postpone the day of final reckoning and intensify the bitterness felt by the people. When the revolt that the government at Berlin must eventually meet comes it will be the more determined for any severities that may now be practiced.

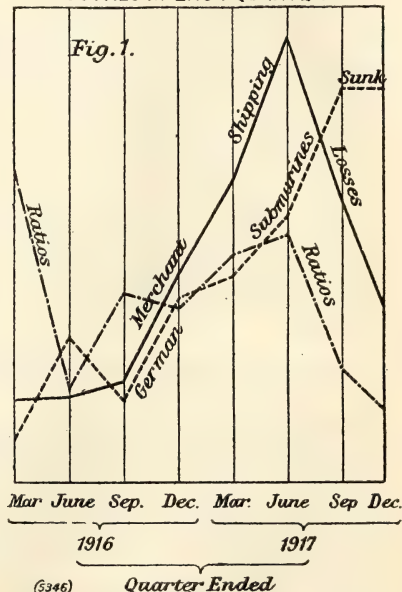
There is great encouragement for the Allies in the fact that this first protest on a large scale against the German military program has gone so far and involved such a large number of workers. It indicates that the heaven of free thought is working in the lump. Doubtless this is a direct result of the negotiations with Russia and the opening of the gates to the infusion of Bolshevik ideas into Germany. Russia may still be Germany's Nemesis.—*Evening Star*, 1/2.

SUBMARINE WAR.—*To the Editor of Engineering. Sir.*—The interesting charts supplied by the naval authorities, published on page 670 of your issue

GROSS TOTALS TO END OF EACH QUARTER



TOTALS IN EACH QUARTER



(5346)

of December 21, showing the losses by enemy action of merchant tonnage (British, allied and neutral) and the German submarines sunk during each quarter, are shown together in Fig. 1. The former is the full line and the latter the dotted line.

Although the scales of the ordinates in both cases are not marked yet, assuming that they are to scale, the ratios of the ordinates of German submarines sunk to those for merchant shipping losses are obtainable.

These are shown in the dot-dash line and indicate that the best relative results have been obtained in the last quarter.

By adding the ordinates for each quarter the gross totals to the end of each quarter have been obtained. These are shown in Fig. 2, and indicate that the merchant tonnage losses have been increasing in a *decreasing* ratio since the June, 1917, quarter, while the German submarines sunk have been increasing in an *increasing* ratio since September, 1916.

The ratio curve indicates that the general trend from June, 1916, to June, 1917, was against us, but has now been reduced to about that of September, 1916.

Yours faithfully,

HENRY G. LLOYD, M. Inst. C. E.

44 Guilford avenue, Surbiton, December 24, 1917. —*Engineering*, 4/1.

LOOKOUTS IN THE SUBMARINE ZONE.—A recent Admiralty order requires that all British merchant vessels of 2500 tons gross and upwards shall include in their crew four men, specially engaged, who are to act as lookouts at the mastheads. In the submarine zone, these men are to be employed solely on their special duty, keeping watch in four watches, each to be of not more than two hours' duration. They must obtain a Board of Trade certificate as to their eyesight; and they will receive extra pay whilst in the submarine zone.—*Scientific American*, 9/2.

AUSTRIA AND THE ALLIES EXCHANGE PRISONERS.—The first exchange of prisoners of war between Austria and the Allies has taken place near the Austrian frontier at Buchs. Three hundred and twenty-four of these exchanged prisoners have arrived at Geneva. They include two American volunteers, one English officer and 70 British colonials, all of whom were captured on the Turkish and Bulgarian fronts. The others were largely English and Scotch. Seventeen of the exchanged men were carried from the train on stretchers.—*Evening Star*, 14/2.

ENDS GERMAN PAY ROLL.—*U. S. Acts When Boches Fail to Reply on Officer's Salary.*—Germany has failed to reply to the proposal of the United States that German commissioned officers, held prisoners here, receive the pay of their grade in return for similar privileges being accorded American officers held in Germany. So the War Department has cut off the payments which were being made to German officers.—*Evening Star*, 29/1.

THE WAR SITUATION.—The Secretary of War has authorized the publication of the following review of the military operations for the week ending February 9:

At dusk on the evening of February 5 off the Irish coast a torpedo launched from an enemy submarine struck the convoyed liner *Tuscania*, having on board American troops. Our loss at the latest report appears to be approximately 113 men.

The fine discipline of the men and the efficient handling of a difficult situation by those in command contributed to account for these relatively slight casualties.

At the same time, we must express our profound appreciation for the splendid work of the British Navy in rescuing our forces.

Notwithstanding the fact that hostile submarines were lurking in the vicinity, the British destroyers rendered every assistance and remained on the scene, succoring our men until all survivors were brought safely ashore.

At the small ports of Ireland and Scotland where our troops were landed they met with a most warmhearted reception on the part of the people, who did all in their power to administer every comfort and care.

The sector in Lorraine where our forces are in contact with the enemy continued relatively active throughout the week. Artillery duels took place intermittently, but fog and heavy rains prevented infantry engagements. The Germans attempted no further raids and settled down to systematic sniping and bombing of our positions.

Our sharpshooters gave a good account of themselves, keeping the enemy parapets well cleared of Germans.

One stretch of our line is very close up to the German position. Here bombing and a frequent exchange of hand grenades occurred.

German aeroplanes made repeated attempts to push their reconnoitering sallies over our lines, but were invariably met with a hot fire from our anti-aircraft guns.

Our forces engaged have shown themselves well fitted for their tasks in the trenches and are rapidly becoming accustomed to the routine of trench warfare. The welfare of our troops, whether in the trenches or in rest depots, is the object of the immediate personal concern of all our commanders. The rations for the men in the trenches, in spite of the enemy's attempts to break up our transport columns, have been regularly assured. The care of the wounded at our field dressing stations, as well as at our base hospitals, is being carried on with efficiency and scientific skill.

Here in America at our cantonments the training of our new armies is proceeding methodically.

The arrival in the western theater of additional German forces coming originally from the Russian front are noted. Further Austrian divisions have also been detached from other zones of operations and are being concentrated in reserve behind the German lines in the west.

Much dissatisfaction is expressed throughout Austria-Hungary at the policy of dispatching their troops to fight Germany's battles along the western front.

The desire for peace is increasing daily in the Dual Monarchy, and it is only natural that the Austrians should resent sacrificing their forces on distant battlefields in the furtherance of German ambitions alien to their interests.

Flanders was again the scene of numerous minor engagements, particularly the region of the Ypres-Staden Railway, where such fierce fighting took place last autumn. Here the British drove a sharp raid into the enemy territory, inflicting casualties and taking prisoners. The British also raided the German lines successfully southwest of Armentieres as well as east of Hargicourt and elsewhere.

The Germans pushed forward repeated reconnoitering thrusts against British positions northeast of Poelcapelle, in the Cambrai salient, and at a number of other points.

Heavy fighting took place along the entire front. Though no actions of more than local character were recorded, it would appear that the long-deferred offensive may develop simultaneously at different points of the line as an outcome of these engagements.

Hostile artillery were busily engaged, and a number of heavy bombardments, in all probability practice barrages, were put down at various points in front of and to the south of the Cambrai sector.

The British took full measure of the enemy in these various undertakings and had the situation well in hand.

The French front was also the scene of much lively fighting. The Germans drove a number of powerful assaults against the French lines in Lorraine, in the region north of Craonne, as well as along the east bank of the Meuse.

In the area bordering the North Sea the French also attempted a blow against the German positions in front of Nieuport. In the neighborhood of Rheims the French penetrated the enemy's lines and took a number of prisoners. In the region of Ailette the French were again successful and

SHIPS	5	10	15	20	25	30	35	40	45	50	55
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—Washington Evening Star, 31/1.

captured the entire detachment of a German outpost. North of the Chemin des Dames and near Flirey the enemy drove forward raiding parties, but achieved no results.

Artillery bombardments took place over an extended front and, while less violent than in the British areas, nevertheless were of greater magnitude than during the preceding week. Hostile fire was particularly intense along the east bank of the Meuse and in upper Alsace.

The French and British carried out a series of very effective air raids; the French dropping many tons of high explosives on munition plants in Alsace, while the British concentrated their energies on bombing the submarine nests at Ostend and Zeebrugge and hostile aerodomes in the zone of operations.

In the Italian theater no important operations took place. The Austrians were busy rearranging their dispositions of units along the front, and the Italians kept up a continuous harassing bombardment of the entire enemy line. Italian patrols were alert in the region of the headwaters of the Brenta. Northeast of the Monte Grappa minor encounters took place.

The enemy unsuccessfully attempted to explode mines in the Monte Pasubio sector. In the Val Lagarina, and especially along the Lower Piave, artillery duels were very lively.

Austrians are continuing their policy of bombing the open towns of the Venetian Plain. The priceless art treasures of Padua, Bassano, Treviso, etc., religiously respected through all other campaigns in Italy, were during the week the targets of Austrian aviators.

The British in Palestine have advanced their lines slightly north of Jerusalem.—*Army and Navy Register*, 16/2.

INDEX OF WAR VESSEL LOSSES MENTIONED IN THIS NUMBER

NOTE.—A complete table of losses since the beginning of the war will be published semi-annually; the latest appears in the January number of the PROCEEDINGS.

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DIPLOMATIC NOTES

FROM JANUARY 18 TO FEBRUARY 18

PREPARED BY

ALLEN WESTCOTT, PH. D., Instructor, U. S. Naval Academy

LONG RANGE NEGOTIATIONS BETWEEN BELLIGERENTS

During the month ending February 18, the spokesmen of the warring powers continued the process—a noteworthy innovation and advance—of negotiations by public manifestoes without cessation of hostilities. In reply to the specific program of 14 points set forth by President Wilson on January 8, the German Chancellor and the Austro-Hungarian Foreign Minister addressed delegates of their respective Parliaments two weeks later (January 24). In subsequent comment on these replies (February 11), President Wilson stated that he found that of Count Czernin “friendly in tone,” that of Count von Hertling “very vague and very confusing.” In effect, the German Chancellor insisted that every territorial problem should be settled, not in general council, but in separate negotiations with the nations particularly concerned. Thus, as in the case of Russia, the Central Powers would secure the advantage of dealing severally with the weaker members of the Entente.

COUNT VON HERTLING'S STATEMENT.—In his speech before the Main Committee of the Reichstag on January 24, Count von Hertling maintained a truculent attitude. He declared that the allies spoke as “victors to vanquished” and “still cast covetous eyes on parts of our territories,” that “Germany's military position was never so favorable as it now is,” and that “if the leaders of the enemy powers really are inclined to peace, let them revise their program once again.”

After an extended German version of international relations preceding the war and German claims in Alsace-Lorraine, the Chancellor discussed President Wilson's program, point by point, as follows:

[Note: President Wilson's address of January 8 appears in full in the February PROCEEDINGS.]

“The first point is the demand that there shall be no more secret international agreements. History shows that it is we above all others who would be able to agree to the publicity of diplomatic documents. I recall that our defensive alliance with Austria-Hungary was known to the whole world from 1888, while the offensive agreement of the enemy states first saw the light of publicity during the war, through the revelations of the secret Russian archives. The negotiations at Brest-Litovsk are being conducted with full publicity. This proves that we are quite ready to accept this proposal and declare publicity of negotiations to be a general political principle.

“In his second point Mr. Wilson demands freedom of shipping on the seas in war and peace. This also is demanded by Germany as the first and one of the most important requirements for the future. Therefore, there is here no difference of opinion. The limitation introduced by Mr. Wilson at the end, which I need not quote textually, is not intelligible, appears superfluous and would therefore best be left out.”

[The limiting clause reads "except as the seas may be closed in whole or in part by international action for the enforcement of international covenants."]

"It would, however, be highly important for the freedom of shipping in future if strongly fortified naval bases on important international routes, such as England has at Gibraltar, Malta, Aden, Hong Kong, the Falkland Islands, and many other places, were removed.

"Point 3: We, too, are in thorough accord with the removal of economic barriers which interfere with trade in a superfluous manner. We, too, condemn economic war, which would inevitably bear within it causes of future warlike complications.

"Point 4: Limitation of armaments: As already declared by us, the idea of limitation of armaments is entirely discussable. The financial position of all European States after the war might most effectively promote satisfactory solution. [Cries of 'Hear! Hear!'] It is therefore clear that an understanding might be reached without difficulty on the first four points of Mr. Wilson's program.

"I now come to the fifth point—settlement of all colonial claims and disputes. Practical realization of Mr. Wilson's principles in the realm of reality will encounter some difficulties in any case. I believe that for the present it may be left for England, which has the greatest colonial empire, to make what she will of this proposal of her ally. This point of the program also will have to be discussed in due time, on the reconstitution of the world's colonial possessions, which we also demand absolutely.

"Point 6: Evacuation of Russian territory: Now that the Entente has refused, within the period agreed upon by Russia and the Quadruple Alliance, to join in the negotiations, I must in the name of the latter decline to allow any subsequent interference. We are dealing here with questions which concern only Russia and the four allied powers. I adhere to the hope that, with recognition of self-determination for the peoples on the western frontier of the former Russian Empire, good relations will be established, both with these peoples and with the rest of Russia, for whom we wish most earnestly a return of order, peace, and conditions guaranteeing the welfare of the country.

"Point 7: Belgium: My predecessors in office repeatedly declared that at no time did the annexation of Belgium to Germany form a point in the program of German policy. The Belgian question belongs to those questions the details of which are to be settled by negotiation at the peace conference. So long as our opponents have unreservedly taken the standpoint that the integrity of the allies' territory can offer the only possible basis of peace discussion, I must adhere to the standpoint hitherto always adopted and refuse the removal in advance of the Belgian affair from the entire discussion.

"Point 8: The occupied parts of France are a valuable pawn in our hands. Here, too, forcible annexation forms no part of the official German policy. The conditions and methods of procedure of the evacuation, which must take account of Germany's vital interests are to be agreed upon between Germany and France.

"I can only again expressly accentuate the fact that there can never be a question of the dismemberment of imperial territory. Under no fine phrases of any kind shall we permit the enemy again to take from us territory of the empire which with ever-increasing intimacy has linked itself to Germanism, which has in highly gratifying manner ever and increasingly developed in an economic respect, and of whose people more than 87 per cent speak the German mother tongue.

"The questions dealt with by Mr. Wilson under points 9, 10, and 11 touch both the Italian frontier question and questions of the future development of the Austro-Hungarian monarchy and the future of the Balkan States; questions in which, for the greater part, the interests of our ally, Austria-Hungary, preponderate. Where German interests are concerned we shall defend them most energetically.

"But I may leave the answer to Mr. Wilson's proposals on these points in the first place to the Austro-Hungarian Foreign Minister. Close contact with the allied dual monarchy forms the kernel of our present policy, and must be the guiding line in the future. Loyal comradeship in arms, which has stood the test so brilliantly in wartime, must continue to have its effect in peace. We shall thus on our part do everything for the attainment of peace by Austria-Hungary which takes into account her just claims.

"The matters touched upon by Mr. Wilson in point 12 concern our loyal, brave ally, Turkey. I must in nowise forestall her statesmen in their attitude. The integrity of Turkey and the safeguarding of her capital, which is connected closely with the question of the Straits, are important and vital interests of the German Empire, also. Our ally can always count upon our energetic support in this matter.

"Point 13 deals with Poland. It was not the Entente—which had only empty words for Poland and before the war never interceded for Poland with Russia—but the German Empire and the Austro-Hungarian monarchy which liberated Poland from the Czaristic régime which was crushing her national characteristics. It may thus be left to Germany and Austria-Hungary and Poland to come to an agreement on the future constitution of this country. As the negotiations and communications of the last year prove, we are on the road to this goal.

"The last point, the 14th, deals with a bond of the nations. Regarding this point, I am sympathetically disposed, as my political activity shows, toward every idea which eliminates for the future a possibility or a probability of war, and will promote a peaceful and harmonious collaboration of nations. If the idea of a bond of nations, as suggested by President Wilson, proves on closer examination really to be conceived in a spirit of complete justice and complete impartiality toward all, then the Imperial Government is gladly ready, when all other pending questions have been settled, to begin the examination of the basis of such a bond of nations."

SCHEIDEMANN FOR PEACE BY AGREEMENT.—Replying to and criticising Count von Hertling's statement to the Main Committee, the Socialist leader Philip Scheidemann asserted that agreement was possible in at least 11 points of President Wilson's program. "Two chief arguments," he said: "were advanced by the military party for the prolongation of the war, namely, the success of the U-boats and the strength of our army. But these were to have given us a decisive victory in six months, according to the announcement made in 1916. Alas, that period has long since passed, and while the U-boat has admittedly harmed England enormously, its chief visible effect has been the entry of America into the war. If the United States had not entered the war we may be sure the Russian revolution would long ago have brought a general peace.

"What about the army? Suppose the army should capture Calais and Paris; would that mean peace? I say 'No!' Suppose the army conquered France and England; would that mean peace? I say 'No!' for we would still have to conquer America."

Herr Scheidemann fiercely attacked the militarist leaders, asserting that their attitude toward Austria was likely to lose for Germany her last friend.

"If our government leaders cannot free us from these 'patriots,'" said the Social Democratic leader, "they had better go. I warn them that if they do not bring us peace with Russia they will be hurled from power."

Herr Scheidemann held that an agreement was easily possible on 11 points of President Wilson's statement.

"But Mr. Wilson must be told plainly," the speaker said, "that Alsace is Germany's and will remain so. If one clear word is spoken regarding Belgium, England's war mongering will end. An honorable, complete reinstatement of Belgium is our duty.

"I cannot see the day," Herr Scheidemann went on, "when Germany will say to the Entente: 'We accept your terms. We are beaten.' But just as little can I see the day when England, France and the United States will say the same to us."—*N. Y. Times*, 27/1.

COUNT CZERNIN'S STATEMENT.—In his speech on January 24, before the Foreign Affairs Committee of the Hungarian Parliament, Count Czernin dealt chiefly with the prospects of peace with Russia, affirming that Austria, for her part, sought neither "a square meter nor a kreutzer from the Russians." His comment on the allies' peace terms was at first reported as follows:

"I think there is no harm in stating that I regard the recent proposals of President Wilson as an appreciable approach to the Austro-Hungarian point of view, and that to some of them Austria-Hungary joyfully could give her approval. But she must first lay down the principle—that in so far as these propositions concern her allies, whether in the case of Germany's possession of Belgium or in the case of Turkey, Austria-Hungary, faithful to her engagements to fight to the end in defence of her allies, will defend the possessions of her war allies as she would her own. That is the standpoint of our allies, in regard to which there is perfect reciprocity."

Count Czernin said as to the second point in President Wilson's peace aims, freedom of the seas, the President had responded to the views of all and that he (Czernin) absolutely and entirely supported this paragraph. Regarding paragraph 3 in President Wilson's proposals—the removal of economic barriers and the establishment of equality of trade conditions—Count Czernin said:

"This article, which pronounces in a formal manner hostility against a future economic war, is so just and reasonable, and its application so often has been urged by us, that we have nothing to add to it."

According to later reports, this early version was garbled. Count Czernin did not refer to Belgium as a *German possession*, and expressed a willingness on the part of Austria to fight only for the *pre-war* possessions of her allies. This vital section of his speech should read as follows:

"So far as these propositions concern her allies, whether in the case of German possessions, Belgium, or Turkey, Austria-Hungary, faithful to her engagements, will go to the extreme in defence of her allies. She will defend the pre-war possessions of her allies as she would her own."

SUPREME WAR COUNCIL ON GERMAN TERMS.—The Supreme War Council of the allies, which met at Versailles, made this official announcement in London on February 3, after its final session for the present:

"The council was unable to find in Count von Hertling's and Count Czernin's recent utterances any real approximation to the moderate conditions laid down by the Allied Governments. Under the circumstances, the council decided that the only task before them to meet was the vigorous and effective prosecution of the war until the pressure of that effort produced a change of temper in the enemy governments justifying the hope of the conclusion of peace based on the principles of freedom, justice, and respect for international law. The council arrived at a complete unanimity of policy on measures for the prosecution of the war."

Generals Tasker H. Bliss, chief of staff, and John J. Pershing, U. S. A., represented our government at the meeting.

PRESIDENT WILSON'S REVIEW OF PEACE TERMS.—President Wilson in an address to Congress on February 11, analyzed the replies of the Central Powers and again outlined the conditions essential to an acceptable peace. He refused to accept Count von Hertling's proposal to confine territorial settlements to the countries immediately concerned. He pointed out that if territorial questions were so settled by separate bargains, separate economic and trade compacts would also be in order. In conclusion he laid down four general principles, requiring in substance that all territorial settlements should be made with the utmost regard for the national aspirations and the benefit of the populations concerned. The address follows in full:

Gentlemen of the Congress:

On January 8 I had the honor of addressing you on the objects of the war as our people conceive them. The Prime Minister of Great Britain had spoken in similar terms on January 5. To these addresses the German Chancellor replied on January 24, and Count Czernin for Austria on the same day. It is gratifying to have our desire so promptly realized that all exchanges of view on this great matter should be made in the hearing of all the world.

Count Czernin's reply, which is directed chiefly to my own address on January 8, is uttered in a very friendly tone. He finds in my statement a sufficiently encouraging approach to the views of his own government to justify him in believing that it furnishes a basis for a more detailed discussion of purposes by the two governments.

He is represented to have intimated that the views he was expressing had been communicated to me beforehand and that I was aware of them at the time he was uttering them; but in this I am sure he was misunderstood. I had received no intimation of what he intended to say. There was, of course, no reason why he should communicate privately with me. I am quite content to be one of his public audience.

Count von Hertling's reply is, I must say, very vague and very confusing. It is full of equivocal phrases and leads it is not clear where. But it is certainly in a very different tone from that of Count Czernin, and apparently of an opposite purpose. It confirms, I am sorry to say, rather than removes the unfortunate impression made by what we had learned of the conferences at Brest-Litovsk.

His discussion and acceptance of our general principles lead him to no practical conclusions. He refuses to apply them to the substantive items which must constitute the body of any final settlement. He is jealous of international action and of international council. He accepts, he says, the principle of public diplomacy, but he appears to insist that it be confined, at any rate in this case, to generalities, and that the several particular questions of territory and sovereignty, the several questions upon whose settlement must depend the acceptance of peace by the 23 states now engaged in the war, must be discussed and settled, not in general council, but severally by the nations most immediately concerned by interest or neighborhood.

He agrees that the seas should be free, but looks askance at any limitation to that freedom by international action in the interest of the common order. He would without reserve be glad to see economic barriers removed between nation and nation, for that could in no way impede the ambitions of the military party, with whom he seems constrained to keep on terms. Neither does he raise objection to a limitation of armaments. That matter will be settled of itself, he thinks, by the economic conditions which must follow the war. But the German colonies, he demands, must be returned without debate. He will discuss with no one but the representatives of Russia what disposition shall be made of the peoples and the lands of the Baltic provinces; with no one but the Government of France the "condi-

tions" under which French territory shall be evacuated; and only with Austria what shall be done with Poland.

In the determination of all questions affecting the Balkan States he defers, as I understand him, to Austria and Turkey; and with regard to the agreements to be entered into concerning the non-Turkish peoples of the present Ottoman Empire, to the Turkish authorities themselves. After a settlement all around, effected in this fashion, by individual barter and concession, he would have no objection, if I correctly interpret his statement, to a league of nations which would undertake to hold the new balance of power steady against external disturbance.

It must be evident to every one who understands what this war has wrought in the opinion and temper of the world that no general peace, no peace worth the infinite sacrifices of these years of tragical suffering, can possibly be arrived at in any such fashion. The method the German Chancellor proposes is the method of the Congress of Vienna. We cannot and will not return to that.

What is at stake now is the peace of the world. What we are striving for is a new international order based upon broad and universal principles of right and justice—no mere peace of shreds and patches. Is it possible that Count von Hertling does not see that, does not grasp it, is, in fact, living in his thought in a world dead and gone? Has he utterly forgotten the Reichstag resolutions of July 19, or does he deliberately ignore them? They spoke of the conditions of a general peace, not of national aggrandizement or of arrangements between state and state.

The peace of the world depends upon the just settlement of each of the several problems to which I adverted in my recent address to the Congress. I, of course, do not mean that the peace of the world depends upon the acceptance of any particular set of suggestions as to the way in which those problems are to be dealt with. I mean only that those problems each and all affect the whole world; that unless they are dealt with in a spirit of unselfish and unbiased justice, with a view to the wishes, the natural connections, the racial aspirations, the security and peace of mind of the peoples involved, no permanent peace will have been attained.

They cannot be discussed separately or in corners. None of them constitutes a private or separate interest from which the opinion of the world may be shut out. Whatever affects the peace affects mankind, and nothing settled by military force, if settled wrong, is settled at all. It will presently have to be reopened.

Is Count von Hertling not aware that he is speaking in the court of mankind, that all the awakened nations of the world now sit in judgment on what every public man, of whatever nation, may say on the issues of a conflict which has spread to every region of the world? The Reichstag resolutions of July themselves frankly accepted the decisions of that court. There shall be no annexations, no contributions, no punitive damages. Peoples are not to be handed about from one sovereignty to another by an international conference or an understanding between rivals and antagonists. National aspirations must be respected; peoples may now be dominated and governed only by their own consent. "Self-determination" is not a mere phrase. It is an imperative principle of action, which statesmen will henceforth ignore at their peril.

We cannot have general peace for the asking or by the mere arrangements of a peace conference. It cannot be pieced together out of individual understandings between powerful states. All the parties to this war must join in the settlement of every issue anywhere involved in it, because what we are seeking is a peace that we can all unite to guarantee and maintain, and every item of it must be submitted to the common judgment whether it be right and fair, an act of justice, rather than a bargain between sovereigns.

The United States has no desire to interfere in European affairs or to act as arbiter in European territorial disputes. She would disdain to take

advantage of any internal weakness or disorder to impose her own will upon another people. She is quite ready to be shown that the settlements she has suggested are not the best or the most enduring. They are only her own provisional sketches of principles, and of the way in which they should be applied.

But she entered this war because she was made a partner, whether she would or not, in the sufferings and indignities inflicted by the military masters of Germany against the peace and security of mankind; and the conditions of peace will touch her as nearly as they will touch any other nation to which is intrusted a leading part in the maintenance of civilization. She cannot see her way to peace until the causes of this war are removed, its renewal rendered, as nearly as may be, impossible.

This war had its roots in the disregard of the rights of small nations and of nationalities which lacked the union and the force to make good their claim to determine their own allegiances and their own forms of political life. Covenants must now be entered into which will render such things impossible for the future; and those covenants must be backed by the united force of all the nations that love justice and are willing to maintain it at any cost.

If territorial settlements and the political relations of great populations which have not the organized power to resist are to be determined by the contracts of the powerful governments which consider themselves most directly affected, as Count von Hertling proposes, why may not economic questions also? It has come about in the altered world in which we now find ourselves that justice and the rights of peoples affect the whole field of international dealing as much as access to raw materials and fair and equal conditions of trade.

Count von Hertling wants the essential bases of commercial and industrial life to be safeguarded by common agreement and guarantee, but he cannot expect that to be conceded him if the other matters to be determined by the articles of peace are not handled in the same way as items in the final accounting. He cannot ask the benefit of common agreement in the one field without according it in the other. I take it for granted that he sees that separate and selfish compacts with regard to trade and the essential materials of manufacture would afford no foundation for peace. Neither, he may rest assured, will separate and selfish compacts with regard to provinces and peoples.

Count Czernin seems to see the fundamental elements of peace with clear eyes, and does not seek to obscure them. He sees that an independent Poland, made up of all the indisputably Polish peoples who lie contiguous to one another, is a matter of European concern, and must, of course, be conceded; that Belgium must be evacuated and restored, no matter what sacrifices and concessions that may involve; and that national aspirations must be satisfied, even within his own empire, in the common interest of Europe and mankind.

If he is silent about questions which touch the interest and purpose of his allies more nearly than they touch those of Austria only, it must, of course, be because he feels constrained, I suppose, to defer to Germany and Turkey in the circumstances. Seeing and conceding, as he does, the essential principles involved and the necessity of candidly applying them, he naturally feels that Austria can respond to the purpose of peace as expressed by the United States with less embarrassment than could Germany. He would probably have gone much further had it not been for the embarrassments of Austria's alliances and of her dependence upon Germany.

After all, the test of whether it is possible for either government to go any further in this comparison of views is simple and obvious. The principles to be applied are these:

First—That each part of the final settlement must be based upon the essential justice of that particular case and upon such adjustments as are most likely to bring a peace that will be permanent.

Second—That peoples and provinces are not to be bartered about from sovereignty to sovereignty as if they were mere chattels and pawns in a game, even the great game, now forever discredited, of the balance of power; but that,

Third—Every territorial settlement involved in this war must be made in the interest and for the benefit of the populations concerned, and not as a part of any mere adjustment or compromise of claims among rival states; and,

Fourth—That all well-defined national aspirations shall be accorded the utmost satisfaction that can be accorded them without introducing new or perpetuating old elements of discord and antagonism that would be likely in time to break the peace of Europe, and consequently of the world.

A general peace erected upon such foundations can be discussed. Until such a peace can be secured we have no choice but to go on. So far as we can judge, these principles that we regard as fundamental are already everywhere accepted as imperative except among the spokesmen of the military and annexationist party in Germany. If they have anywhere else been rejected, the objectors have not been sufficiently numerous or influential to make their voices audible. The tragical circumstance is that this one party in Germany is apparently willing and able to send millions of men to their death to prevent what all the world now sees to be just.

I would not be a true spokesman of the people of the United States if I did not say once more that we entered this war upon no small occasion and that we can never turn back from a course chosen upon principle. Our resources are in part mobilized now, and we shall not pause until they are mobilized in their entirety. Our armies are rapidly going to the fighting front, and will go more and more rapidly. Our whole strength will be put into this war of emancipation—emancipation from the threat and attempted mastery of selfish groups of autocratic rulers—whatever the difficulties and present partial delays.

We are indomitable in our power of independent action, and can in no circumstances consent to live in a world governed by intrigue and force. We believe that our own desire for a new international order, under which reason and justice and the common interests of mankind shall prevail, is the desire of enlightened men everywhere. Without that new order the world will be without peace and human life will lack tolerable conditions of existence and development. Having set our hand to the task of achieving it, we shall not turn back.

I hope that it is not necessary for me to add no word of what I have said is intended as a threat. That is not the temper of our people. I have spoken thus only that the whole world may know the true spirit of America—that men everywhere may know that our passion for justice and for self-government is no mere passion of words, but a passion which, once set in motion, must be satisfied. The power of the United States is a menace to no nation or people. It will never be used in aggression or for the aggrandizement of any selfish interest of our own. It springs out of freedom and is for the service of freedom.

LOYD GEORGE SEES NO GENUINE PEACE.—London, February 12.—Addressing the House of Commons to-day at its reassembling after prorogation last week, Premier Lloyd George said he had read with profound disappointment the replies given to President Wilson and to the declarations of the British Government by Count von Hertling and Count Czernin, and added that it was perfectly true that, as regarded the tone, there was a great deal of difference between the two speeches, and he wished he could believe there was a difference in substance, but when there was a question of considering the real demands of the allies, he said, Count Czernin was adamant.

He remarked that he would like any member to point out anything in the speeches of Count Czernin or Count von Hertling which could possibly be

regarded as proof that the Central Powers were prepared to make peace on terms which could be regarded as just and reasonable.

Germany's action regarding Russia, he said, proved that her declaration regarding no annexations had no real meaning. No answer had been given regarding Belgium that could be regarded as satisfactory, he declared; no answer had been given regarding Poland or France, with her legitimate claims for the restoration of her lost provinces; not a word had been said about the thousands of the Italian race and tongue now under the Austrian yoke.

Until there was some better proof than had been provided in the speeches to which he referred that the Central Powers were prepared to consider the aim and ideals for which the allies were fighting, said Mr. Lloyd George, it would be the nation's regrettable duty to go on and make preparations necessary in order to establish international rights.

The Premier said the government stood by the considered declaration made at the meetings with the trade union representatives early this year.

It did not recede in the least from its war aims as they had been stated. It was no use, he said, crying peace when there was no peace.—*N. Y. Times*, 13/2.

FURTHER DISCUSSION TO FOLLOW.—It was announced from Berlin that Count von Hertling would take up the Ukraine Peace Treaty and President Wilson's message during the Reichstag sessions beginning February 21.

PEACE WITH UKRAINE

In the peace negotiations at Brest-Litovsk, the representatives of the Central Powers deprived the Bolshevik commissioners of the chief card in their hands—Russian food supplies—by negotiating a separate peace with the newly formed republic of Ukrainia, comprising within its tentative boundaries one-third of the agricultural lands of Russia. The advantage to the Central Powers of this policy of separatism in Russia is obvious, since it not only divides the country into warring factions, but enables the Central Powers to conclude advantageous commercial and economic bargains with the weak states thus formed. The agreement with Ukrainia, however, created some difficulties, since the cession to the new state of the small district of Cholm in Russian Poland raised the hot antagonism of all Polish elements within the two empires. Furthermore, at the time of the treaty a struggle was still going on in Ukrainia between the bourgeois government under the Rada or legislative assembly, and the rival government set up by the Bolsheviks.

The treaty, which was signed February 8, established the old Austro-Russian frontier as the western boundary of the new state and gave it a liberal northern frontier at the expense of the rest of Russia. In particular, the treaty provided rates of exchange and other agreements for reopening trade. The terms of the treaty are in part as follows:

The treaty is entitled: "A Treaty of Peace Between Germany, Austria-Hungary, Bulgaria, and Turkey on one Part and the Ukrainian People's Republic on the Other."

The preamble states that the Ukrainian people, having in the course of the present world war declared itself to be independent and expressed a wish to restore peace between itself and the powers at war, desires "to take the first step toward a lasting world's peace, honorable to all parties, which shall not only put an end to the horrors of war, but also lead to the

restoration of friendly relations of the peoples in political, legal, economic, and intellectual realms."

The names of all of the plenipotentiaries engaged in the negotiations are then set forth, and they are declared to have reached an agreement on the following points:

Article I.—Germany, Austria-Hungary, Bulgaria, and Turkey on the one hand and the Ukrainian People's Republic on the other declare that the state of war between them is at an end. The contracting parties are resolved henceforth to live in peace and friendship with one another.

Article II.—Between Austria-Hungary on the one hand and the Ukrainian People's Republic on the other hand, as far as these two powers border one another, those frontiers will exist which existed before the outbreak of the present war between the Austro-Hungarian monarchy and Russia. Further north the frontier of the republic beginning at Tarnegrad will in general follow the line of Bilgerey to Sroezberzszyn, Krasnostau, Pugasze, Radzyn, Meshiretschei, Sarnaki, Selnik, Wysekelitowsk, Kamiet-slitowsk, Prushany, and Wydozowskyesee. This will be fixed in detail by a mixed commission according to ethnographical conditions and with a regard to the desires of the population. Should the Ukrainian People's Republic yet have common frontiers with another of the powers of the Quadruple Alliance, special agreements will be made thereon.

Article III.—The evacuation of occupied territories will begin immediately after the ratification of the present treaty. The manner of carrying out the evacuation and transfer of the evacuated territories will be determined by the plenipotentiaries of the interested parties.

Article IV.—The diplomatic and consular relations between the contracting parties will be entered upon immediately after the ratification of the peace treaty. The widest possible admittance of the respective parties to Consuls is to be reserved for a special agreement.

Article V.—The contracting parties mutually renounce the reimbursement of their war costs—that is to say, the state expenditure for carrying on the war, as well as indemnification for damages—that is to say, those damages suffered by them and their subjects in the war, as through military measures, including all requisitions made in the enemy's countries.

Article VI.—The respective prisoners of war will be permitted to return home, and, as far as they do not desire, with the approval of the state concerned, to remain in its territories or proceed to another country. The regulation of the questions connected herewith will follow by means of separate treaties provided for in Article VIII.

Article VII.—The contracting parties undertake mutually and without delay to enter into economic relations and organize an exchange for goods on the basis of the following prescriptions:

1. Until the 31st day of July of the current year reciprocal exchange of the more important surplus supplies of agricultural and industrial products will be carried out as follows for the purpose of covering current requirements: The quantities and sorts of products to be exchanged will be settled by a joint commission, to sit immediately upon the signature of the peace treaty. Prices will be regulated by the joint commission. Payments will be made in gold on the basis of 1000 German imperial gold marks as the equivalent of 462 gold rubles of the former Russian Empire, or 1000 Austro-Hungarian gold kroner as the equivalent of 393 rubles, 78 kopeks of the former Russian Empire. The exchange of goods fixed by the joint commission aforementioned, which commission will consist of equal numbers of representatives of both parties, will take place through state central bureaus. The exchange of those products which are not fixed by the aforementioned commission will take place by the way of free trade, according to the stipulation of a provisional commercial treaty.

2. So far as it is not otherwise provided, the economic relations between the contracting parties shall continue provisionally, and in any case until the conclusion of a final commercial treaty. But until the termination of

a period of at least six months after the conclusion of peace between the Central Powers on the one part and the European states at war with the Central Powers, as well as the United States and Japan on the other part, certain prescriptions are laid down as a basis of relations.



DISMEMBERED RUSSIA.

From N. Y. Times, Feb. 17

As regards economic relations between Germany and Ukraine the text of the treaty prescribes what parts of the Russo-German commercial and shipping treaties of 1894 and 1904 shall be put into force. The contracting parties further agree to maintain the general Russian customs tariff of January 13, 1903.

The treaty also provides (Section 3) which parts of the Austro-Hungarian-Russian commercial and shipping treaty of February 5, 1906, shall be maintained, and adds:

All parties agree that all articles transported across the territory of either party shall be free of duty. Trade-mark agreements are resumed, and the contracting parties agree to support each other in restoring railway tariffs. Economic relations between Bulgaria and Turkey and Ukraine are to be settled according to the most favored nation definition until definite commercial treaties are concluded.

If the period provided for in the first paragraph of Section 2¹ should not occur before June 30, 1919, each of the two contracting parties is free from June 30, 1919, to give six months' notice to terminate the prescriptions contained in the above-mentioned section.

Articles 4 and 5 provide that neither party shall claim preferential treatment such as conferred upon some third adjoining country by customs alliance, and that all importation restrictions shall be removed on goods of either party stored in neutral states.

Article VIII.—Restoration of public and private legal relations, the exchange of prisoners of war and interned civilians, the question of amnesty and the question of the treatment of merchantmen in enemy hands will be regulated in separate treaties with the Ukrainian People's Republic, to form an essential part of the present peace treaty, which, so far as practicable, will take effect simultaneously therewith.

Article IX.—The agreements made in this peace treaty form an indivisible whole.

Article X.—For the interpretation of this treaty the German and Ukrainian texts are authoritative in regard to relations between Germany and Ukraine, the German, Hungarian, and Ukrainian texts for relations between Austria-Hungary and Ukraine, the Bulgarian and Ukrainian texts for relations between Bulgaria and Ukraine, the Turkish and Ukrainian texts for relations between Turkey and Ukraine.

The concluding part of the treaty provides:

"The present peace treaty will be ratified. Ratified documents shall be exchanged as soon as possible. So far as there are no provisions to the contrary, the peace treaty shall come into force on ratification."

The supplementary treaties provided for in Article VIII, also were signed. They cover the following points:

Restoration of consular relations.

Restoration of state treaties.

Restoration of civil law.

Indemnification for civil damages caused by laws of war or by acts contrary to international law.

Exchange of war prisoners and interned civilians.

Care of burial grounds of those fallen in enemy territory.

Provision for the return to their homes of persons affected by the treaty.

Treatment of merchant vessels in enemy hands.

The Brest-Litovsk dispatch says that the text of the supplementary agreements must be withheld for the present to avoid overcrowding the telegraph wires.

POPULATION AND RESOURCES OF UKRAINE

The population of Ukraine consists of about 28,000,000 Ruthenians, or Little Russians, speaking a dialect differing from Great Russian as Lowland Scotch from English. Three million members of the same race inhabit the Austrian province of Galicia. The old régime in Russia opposed every nationalistic aspiration on the part of the Ukrainians, denying the Little Russian dialect any official status in court or schools. As a result, in spite

of the fact that the Poles have been favored at the expense of the Ruthenians in Galicia, there has been a flourishing pro-Austrian propaganda within the Ukraine which has facilitated the present outcome.

The Ukrainian movement in Russia is partly national and partly a land question. The Bolsheviks, who believe in a redistribution of land, emphasize the latter; the Rada group stand alone on their separate and proclaimed nationality.

Both questions, however, are of as great importance to Austria-Hungary as they are to Russia, for the Ukraine include not only the southeastern provinces of Russia, but a large portion of territory in East Galicia, in Northeastern Hungary and in Bukovina, and in the latter territories the national character of the movement is most pronounced. This is in the main due to the policy of the Austrian Government before the war, which favored the Ukrainians of East Galicia in proportion as the old Russian Government persecuted them. The result was that Lemberg became the intellectual center of the Ukrainians where refugees from Kiev found a ready welcome.

Just a month after the March revolution in Petrograd, the Ukrainian National Congress was opened at Kiev. It confined itself to a proclamation of national territorial and political entity and provided for the election of the Rada. The election was held immediately, and the Rada, from a National Council, later transformed itself into a legislature under the presidency of Professor Hrushevski.

When the Provisional Government collapsed the Rada lost no time in grasping the situation. Its first act was to attempt to prevent the spread of Bolshevism in the Ukraine; its second was to present its nationalist question to the Central Powers and attempt to negotiate peace on that basis in exchange for the vast stores of wheat and other supplies which had been collected at Kiev and neighboring cities for the use of the Southern Russian armies.

On November 20 the government of the Ukraine was entirely reconstructed on democratic lines, with Socialist proclivities. Its president was M. Vinnitchenko, himself a Social Democrat. Professor Hrushevski was still president of the Rada. Warned by the fate of Kerenski, the government pursued what it called a "Nationalist Democratic" course, supported by, but not recognizing, the bourgeoisie on the one hand and on the other opposing the extreme demands of the Bolsheviks.

The new republic, if it can maintain its existence, will control about 850,000 square kilometers, with Kiev as its chief city, and the port of Odessa on the Black Sea, through which, before the war, 70 per cent of Russia's exports were shipped. Ukraine, comprising one-sixth of European Russia, has 32 per cent of all the farm land, about 60 per cent of the iron mines, 75 per cent of the coal, and in peace time about 30,000,000 head of cattle.

One difficulty in developing trade with the Central Powers will be the present disorganization of the country and lack of railroad facilities, there being but one or two rail routes across the border, with a change of gauge at the frontier. Upon peace with Roumania, goods could be shipped by way of the Danube.

OPPOSITION OF THE POLES.—The Austrian Poles, furious "at the violation of the national unity" by the peace with the Ukraine and the old Polish territory thereby handed over to the Little Russians, are uniting with the Czechs, Italians, Rumanes, and South Slavs. In parliament these anti-German elements slightly exceed the government bloc. The Social

Democrats hold the balance of power, and they are expected to use it to overthrow the government. Meanwhile, in Cracow, which still remembers its part in the Polish insurrections of 1830 and 1846, the peace with the Ukraine is celebrated by the displays of black flags, insulting the festivity at Vienna. The position of the Austrian Government has been ticklish for a long time. The bitterness and the independent policy of Czechs, Slavs, Slovenes, Slovaks, Poles against that government have been steadily increasing. The worse the plight of Austria the sharper the demands of the discontented nationalities.—*N. Y. Times*, 17/2.

COUNT CZERNIN ON UKRAINE PEACE.—Amsterdam, February 15.—A dispatch received here from Vienna says that Count Czernin spoke as follows of the treaty with Ukraine:

"What has happened at Brest-Litovsk," Count Czernin said, "is not yet the end of the war, but it is the beginning of the end. Not only political diseases but political recoveries are infectious, and peace will be so, too.

"Moreover, the strangling blockade of the Entente has been broken by the signing of the peace with the Ukraine, with its bread. The difficulties of transport certainly still are considerable, but all necessary preparations have been made, and, if conditions do not alter, an improvement will take place."

Count Czernin added that he had assurances that Austrian prisoners of war would be released. Civil war between Russia and the Ukraine might cause difficulties, but he was full of hope. In conclusion Count Czernin said:

"If ever confidence was justified, it is to-day. I am firmly convinced that we have only to hold out a little longer and an honorable general peace will be attained."—*N. Y. Times*, 16/2.

TROTZKY BREAKS OFF NEGOTIATIONS

On February 10, following the peace treaty with Ukraine, negotiations ended between the Bolsheviks and the Central Powers, Leon Trotzky refused to accept the terms offered by Germany, but at the same time declared Russia out of the war. The following official statement was issued explaining the attitude of the Bolshevik Government.

The peace negotiations are at an end. The German capitalists, bankers, and landlords, supported by the silent co-operation of the English and French bourgeoisie, submitted to our comrades, members of the peace delegations at Brest-Litovsk, conditions such as could not be subscribed to by the Russian revolution.

The governments of Germany and Austria possess countries and peoples vanquished by force of arms. To this authority the Russian people, workmen and peasants, could not give its acquiescence. We could not sign a peace which would bring with it sadness, oppression, and suffering to millions of workmen and peasants.

But we also cannot, will not, and must not continue a war begun by Czars and capitalists in alliance with Czars and capitalists. We will not and we must not continue to be at war with the Germans and Austrians—workmen and peasants like ourselves.

We are not signing a peace of landlords and capitalists. Let the German and Austrian soldiers know who are placing them in the field of battle and let them know for what they are struggling. Let them know also that we refuse to fight against them.

Our delegation, fully conscious of its responsibility before the Russian people and the oppressed workers and peasants of other countries declared on February 10, in the name of the Council of the People's Commissaries of the government of the Federal Russian Republic to the governments of

the peoples involved in the war with us and of the neutral countries, that it refused to sign an annexationist treaty. Russia, for its part, declares the present war with Germany and Austria-Hungary, Turkey, and Bulgaria at an end.

Simultaneously, the Russian troops receive an order for complete demobilization on all fronts.

The signatures of Leon Trotzky and other members of the delegation are appended.

FUTURE COURSE OF GERMANY.—In spite of the bewildering situation created by the action of Trotzky, it appeared clear from despatches of February 17 that Germany would require military forces to maintain her eastern line, and that she would be called upon to give military support to the Ukraine. At this date Germans and pro-Germans in Russia were being arrested, and the German commission at Petrograd found it difficult to continue negotiations for the exchange of prisoners.

Austria manifested an unwillingness to take further part in hostilities against Russia.

RUMANIA

Despatches of February 10 stated that Field Marshal von Mackensen had sent an ultimatum to the Rumanian Government on February 6 demanding that peace negotiations be entered upon within four days. Newspaper discussion in Germany indicated a possible policy on the part of the government to offer Rumania compensation in the Russian territory of Bessarabia for the loss of Dobrudja to Bulgaria.

The resignation of the veteran Premier of Rumania, Bratiano, was reported on January 28, and was explained as the result of disagreement between liberal and conservative factions within the cabinet. Despatches of February 15 announced a non-partisan ministry under General Averescu, former Minister of War, and lately commander in Dobrudja.

As a result of the occupation of parts of Bessarabia by Rumanian forces and hostility to Bolshevik propaganda on the part of Rumania, the Bolshevik Government on January 26 announced that diplomatic relations with Rumania were broken off, and that the Rumanian gold reserves in Moscow, amounting to 1,200,000,000 rubles, were to be seized.

SECRET DOCUMENTS PUBLISHED

The N. Y. *Evening Post* of January 25, 26, and 28 published a series of secret agreements, telegrams, memoranda, etc., exchanged between the Western Powers and the old régime in Russia. These had been thrown before the world by the Bolsheviks as evidence in their case against the ruling powers in both groups of belligerents. While the documents reveal the pitfalls and evils of secret diplomacy, it is difficult to see how the Entente could have united and increased its strength without such bargaining. There is little in the documents that has not been for some time a matter of common knowledge or general suspicion.

Foreign Minister Trotzky contributes a preface condemning secret diplomacy as part and parcel of "imperialistic rapaciousness" and the "domination of capital." The contents may be listed as follows:

1. The Entente agreement with Italy (May, 1915) pledging military and naval cooperation, recognizing Italy's *irridenta* claims in Trent, Istria, and Dalmatia, and promising a loan from England of at least £50,000,000.
2. A memorandum from General Polivanof on the effect of Rumania's military defeat upon her territorial claims (November, 1916).
3. A confidential memorandum of offers to Greece of territory in southern Albania and Asia Minor (November, 1915-May, 1916).
4. An agreement for the future division of Asia Minor and the Near East (February 21, 1917).
5. Telegram from Sazanoff to Russian Ambassadors referring to future territorial adjustments and a project for excluding Germany from trade with China.
6. Telegram from Russian Foreign Office agreeing to French proposals for restoration of Alsace and neutralization of territory west of the Rhine (January 30, 1917).
7. Agreement to Russian control of Constantinople and the Dardanelles, with Constantinople a free port, and freedom of passage for merchant vessels through the straits (March 4, 1915).
8. Report of a conference of bankers from the Central Powers and the Entente at Berne in September, 1917, at which the German delegates proposed peace terms at the expense of Russia. Following the conference, according to a telegram from the Russian *chargé* at Berne, "an Anglo-Jewish financier stated that the German aim was to promote separation in Russia so far as possible, so as to split her up into small states. For Germany it will be easy to conclude commercial treaties with weaker states (Lithuania, Courland, etc.)."
9. A series of telegrams from Foreign Minister Tereschenko to Russian diplomats abroad explaining changes in the Russian situation (August-October, 1917).

GERMANY

LABOR DISTURBANCES SUPPRESSED BY MILITARY FORCE.—During the last week in January strikes and peace riots broke out in Germany and spread with great rapidity, crippling the great war industries and threatening the government. At Hamburg the laborers in the Vulcan Works struck on Monday, January 27. At Kiel the workmen in government and private shipyards went out. It was estimated that there were nearly 500,000 strikers in Berlin alone.

The movement was under the control of Socialist leaders of both the majority and independent factions. A "Workmen's Council" was formed, with an "action commission" of 10 members including Haase, Scheidemann, Ledebour, Dittmann and other Socialist leaders. At the court martial of Dittmann, according to an Amsterdam despatch of February 6, he declared that the uprising was "a demonstration strike against a peace of annexations and in favor of a peace by understanding."

"If the government had entered into negotiations as requested," Dittmann testified, "the strike would have lasted only three days." Scheidemann supported Dittmann's testimony as to the political purpose of the strike. Dittmann was sentenced to five years' confinement for inciting to high treason.

The disturbances were in the nature of a counter-demonstration against the propaganda of the Fatherland or Pan-German party. Meetings of this party at Munich, Stuttgart, and elsewhere were broken up by hostile masses. At Munich, according to the *Tägliche Rundschau*, the singing of "Deutschland Ueber Alles" was drowned out by a crowd shouting the "Marseillaise." The following demands were addressed by the strikers to the government:

1. Accelerated conclusion of a general peace without indemnities or annexations.
2. Participation of workmen's delegates of all the countries in the peace pourparlers.
3. Amelioration of the food situation by better distribution.
4. Immediate abolition of the state of siege and restoration of the right of public meetings suspended by the military authorities.
5. Abolition of militarization of war factories.
6. Immediate release of all political prisoners.
7. Fundamental democratization of state institutions.
8. The institution of equal electoral suffrage by direct or secret ballot.

The strike movement was crushed within a week's time by strong military measures—declaration of martial law, arrest of strikers, and court martial of the leaders.

AMSTERDAM, February 4.

Although the German strike appears to be a pretty complete failure, nevertheless it will not remain without consequences. The attitude of the strikers and those who remained outside the movement is certain to be made more bitter.

Once more it has been impressed upon German workers that they live under a system which is little better than a military dictatorship. They will not fail to note the difference between the action of the German Government and that of the Austrian authorities. In Germany the government clamped down all freedom, refused to have anything to do with the workers, and left the military to put down the movement by force. Not for a minute did justice to the workers' demands influence the government.—*N. Y. Times*, 6/2.

AUSTRIA.

STRIKES AND FOOD RIOTS.—On January 18 a general strike was proclaimed in Austria, 100,000 men quitting work in Vienna and Neustadt. While the strike was precipitated by the reduced flour ration, the delegates of the workmen informed the government that "the demand for peace took precedence over other demands."

The labor agitation in Austria excited great interest and expectation abroad, but it appears that it lasted not more than two or three days and was ended by consultations between the workmen and the government, after which the strikers went back to work.

The *N. Y. Herald* of February 7 wrote as follows:

"In the latest despatches there are intimations that the Austrian strike situation is clearing, the government having indicated its willingness to

accede to the surface demands of the strikers. That is not unlikely, and yet we may be just at the beginning of the wider agitation of which the strikes are an advance manifestation.

"More significant of a real situation in the dual monarchy than reports of happenings there which come by either of the long way around routes is the comment of the German press. *Vorwaerts* calls upon the German Government to negotiate peace on the Czernin program announced at Brest-Litovsk and is promptly suppressed. The *Tägliche Rundschau* charges the Austrian Government with promoting the "democratic internationalism" that in turn is assumed to have promoted the strikes throughout Austria-Hungary, while the *Frankfurter Zeitung* intimates that the strike situation is of Count Czernin's "stage management." The German press as a whole is critical. Austria-Hungary is reminded that its armies would have been wiped out except for German leadership and German support, and is taunted with lack of gratitude—which is rubbing salt into the open wound."

SEYDLER CABINET RESIGNS.—Amsterdam, February 8.—Dr. von Seydler, the Austrian Premier, has offered the resignation of his entire cabinet to Emperor Charles, according to a dispatch from Vienna.

The resignation of the cabinet, it is understood in parliamentary circles in Vienna, is due to the opposition of Polish Deputies to special debates and the provisional budget. The opposition of the Deputies makes a majority for the budget doubtful.

The cabinet of Dr. von Seydler, which was formed last June, was reported to have resigned while the recent labor crisis was on in Austria-Hungary. This report was not confirmed.

Dr. von Seydler was able to bring about the cessation of the strike by informing labor delegations on January 20 that it was the wish of the Austrian Emperor to end the war at the earliest possible moment by an honorable peace. Other members of his government promised labor and military reforms, after which the labor leaders ordered their followers to return to work. This virtually ended the strikes in Vienna.

The cabinet of Dr. von Seydler was of a stop-gap bureaucratic character, organized after it had been found impossible to form a ministry which could work with the Austrian parliament on a positive program of internal reform and reorganization.—*N. Y. Times*, 9/2.

UNITED STATES

ALL U. S. EXPORTS AND IMPORTS UNDER LICENSE.—By a sweeping proclamation issued February 15, President Wilson made subject to control by license the entire foreign commerce of the United States. The object of the proclamation was to release ships for the transport service to France, and it is estimated that at least 1,000,000 additional tons will be made available.

Trade with South America and the Orient will be largely affected, according to a statement of the War Trade Board on February 15. The action was decided upon finally when agreements with Holland and some of the other neutral nations of Europe brought within the control of the government 500,000 tons or more of shipping, which is not to be sent into the submarine zone. French sailing ships will also be used to take the place of some of the diverted American tonnage, and the general result will be the withdrawal within a comparatively short time of all American tonnage fit for overseas service from coastwise South American and Pacific trade.

It is possible also that with the reduction of trade between the United States and nations in the Orient, additional Japanese tonnage will be brought into the transatlantic service, thus contributing more directly to the war.

SHIPPING AGREEMENT WITH HOLLAND.—In London M. van Vollenhoven, special commissioner for Holland, and Charles H. Sherrill of the American War Trade Board, who represents all the allied governments, are completing details of an allied-Dutch agreement concerning Dutch shipping for the allies and allied food and other supplies for Holland. Holland is to receive rations of foodstuffs and industrial materials based on the known necessities of the country subject to the world shortage of food and raw stuffs. These will be carried in Dutch vessels. The entire residue of the Dutch merchant marine will then be placed at the allies' disposal for transportation needs outside the war and danger zone.—*N. Y. Times*, 12/2.

TRADE AGREEMENTS WITH NORTHERN NEUTRALS.—Our government's new trade agreement with Sweden, parts of which have been signed at London, completes the list of such compacts with the northern European neutrals. It follows acceptance of the War Trade Board's terms by Switzerland, Denmark, Finland, Holland, and Norway. Some of the Swedish ships lying at our ports will unload their cargoes and then, under charter to our government, go into the trade with South America. A few will be permitted to carry supplies to Sweden. A final decision as to the quantity and character of these has not been reached, and the terms soon to be accepted are not published. Undoubtedly they forbid the sale of food or metals to our enemies. Until a few months ago Germany was importing from Sweden large quantities of high-grade iron to be used in her munition factories.

All the northern neutral countries from which Germany in 1916 received food enough to support her entire army on the west front are now assenting to the blockade designed to deprive her of imported food, metals, and other essential products.—*N. Y. Times*, 31/1.

REVIEW OF BOOKS

ON

SUBJECTS OF PROFESSIONAL INTEREST

"Naval Power in the War." By Lieut. Commander C. C. Gill, U. S. Navy. Price \$1.25 net. (New York: Geo. H. Doran Company.)

This book is a contemporaneous history of the naval aspect of the war and is written not so much with a view toward completeness in detail as with the idea of bringing out the necessary points of naval policy, strategy and tactics. The text had its origin in a series of lectures delivered by Lieut. Commander Gill to the midshipmen at the Naval Academy in 1915-1916 and first appeared in the *Current History Magazine* of the *New York Times*. In addition to a preliminary discussion of sea power and a general estimate of the situation, a chapter is devoted to each of the following naval actions: Heligoland Bight, Coronel, Falkland, Dardanelles, Dogger Bank and Jutland, with additional chapters on submarine and anti-submarine warfare and the naval lessons of the war. In the appendix there are articles on the comparative strength of navies, illustrated by excellent sketches and diagrams; the *Emden* exploits; and on America's part in the development of naval weapons and tactics. This book, which is in no sense propaganda, should meet the needs of the present popular interest in naval affairs, particularly in submarine warfare. It is used for instruction purposes at the U. S. Naval Academy in the naval history course in the department of English.

A. W. B.

"Small Arms Instructors' Manual, 1918." Compiled by the Small Arms Instruction Corps. 60 cents net. (New York: E. P. Dutton and Company.)

This is a manual of convenient size and moderate price that gives an excellent presentation of data required by every one whose duties in any way bear on the training of individuals and units in the use of small arms.

Inasmuch as it would be manifestly impossible to produce in one volume all the information and knowledge available on the use of the rifle and pistol, while at the same time it is highly desirable for instructors in this work to be equipped with a manual that contains the information essential to it, it is considered that this is a very valuable, not to say necessary, step to present in one volume the methods of training together with the data that is considered indispensable to an intelligent understanding not only of those methods, but of the use of small arms as they apply to both the soldier and the leader.

It is evident that those who prepared the work devoted considerable thought to their object, having in mind the needs of the instructor and also the limitations of the pupil, and the result is a book that presents clearly and

without excess verbiage the knowledge necessary for a competent instructor as well as for a good rifleman. The book should be in the hands of every one whose duties are in any way allied with the training of men in the use of small arms, either in the gallery, on the target range, or the battlefield.

A. D. R.

"The Flyer's Guide." By Captain N. J. Gill, Royal Artillery. \$1.50 net. (New York: E. P. Dutton and Co.)

This book will be a valuable asset for the man who intends to become an aeroplane pilot. Captain Gill treats his subject in the most elementary manner, thereby making his book of especial interest to the beginner. The book is written from the beginner's viewpoint, and the facts brought out are those which generally puzzle the novice, and which are usually learned only after considerable practical experience. The subject is treated from a neutral standpoint in so far as any particular type of machine is concerned, and is equally interesting and instructive whether the prospective pilot intends to operate a biplane or a monoplane.

The author divides his subject into two main parts. The first deals in three chapters with the steps necessary to become a practical flyer and instructs in the art of taking care of an aeroplane. The first chapter deals with the steps necessary to obtain a pilot's license, the second with remarks on practical flying, and the third with the construction of aeroplanes. As said above these chapters are technical only in the smallest degree, but cite many valuable points necessary for the beginner to learn, which are generally only learned as the result of hard experience.

The second part covers, in three chapters, the elementary theory of flight, internal combustion engines, and ignition devices. No details are given of any particular engine or ignition device, but the description is such that the general theory of both is well covered. This part of the book shows the reader what it is necessary to study and thoroughly grasp before it is possible to become a practical aeroplane pilot.

This book is recommended to all who have the desire to become aeroplane pilots as it gives an excellent idea of what has to be studied and learned before becoming a successful practical flyer.

T. G. E.

"Army and Navy Uniforms and Insignia." How to know rank, corps, and service in the military and naval forces of the United States and foreign countries. With 8 illustrations in color and 117 in black and white. By Col. Dion Williams, U. S. Marine Corps. 294 pages. Price \$1.50 net. (New York: Fred. A. Stokes Company, 1918.)

"Military and Naval Recognition Book." A handbook of the organization, insignia of rank, and customs of the world's important armies and navies. With 54 full-page plates, 18 in colors. By Lieutenant J. W. Bunkley, U. S. Navy. 218 pages. Pocket size. Price \$1.00. (New York: Van Nostrand Company, December, 1917.)

Our entry into the war, with the sudden appearance of military and naval uniforms throughout the country, and the call to every village to sup-

ply its quota to one or another branch of the service, has naturally aroused a keen general interest in every aspect of military affairs. One phase of this interest, the layman's curiosity regarding the uniforms, insignia, and customs of our fighting forces, the books listed above are admirably designed to gratify. And in view of the intricacies of the subject and the space given to foreign armies and navies, they should also prove very useful to men both new and old within the service.

A brief comparison will suggest the scope of the two books and the main differences between them. Each gives about 68 pages to foreign uniforms. While Colonel Williams' book is considerably larger, the additional space is devoted chiefly to historical information and fuller descriptions. As regards the value of the latter, it may be said that in explaining rank and corps insignia, specialty marks, etc., the pictures are all-important; verbal descriptions are as difficult to visualize as a landscape in Scott's novels.

Colonel Williams gives 22 pages to the Marine Corps; Lieutenant Bunkley gives two. Similarly, the first writer gives much more space to the Coast Guard, Light House Service, and Coast and Geodetic Survey, and devotes 12 pages to the Health Service, which the second writer does not treat. On the other hand, there is nothing superfluous in the Recognition Book. Its style is concise, simple, and definite.

The complexity of the subject treated is indicated by the fact that slight errors appear in both volumes. Neither book mentions in the text the army second lieutenant's new half-inch gold shoulder bar and brown sleeve braid, though they appear in the plates. The anchor on a midshipman's collar is not "foul" (Bunkley, p. 110), and there seems no reason for spelling *sergeant* two ways on the same page (*Ibid.*, p. 92). A lieutenant commander is not identified by a "silver leaf" (Williams, p. 112); in fact, the emblem is properly described on p. 123. In view of the non-existence of a Belgian Navy, better subjects for illustration could perhaps be found than the flags of Belgian admirals and commodores (Williams, p. 56). When several cuts appear on the same page, the better practice would be to put the appropriate legend immediately under each, instead of together at the foot of the page, as in the author last mentioned. The difficulty is increased when, as on page 172, the legends appear on the wrong page.

These slips are mentioned as matters of detail, rather than as a reflection on the general excellence and accuracy of the two volumes, which represent most useful work well done.

A. F. W.

"The Fleets Behind the Fleet." By W. MacNeile Dixon, Professor in the University of Glasgow. 127 pages and two maps. Price 2s. 6d. (Hodder and Stoughton. Doran and Co., N. Y. agents.)

Here are 127 pages of fluent and readable rhetoric in praise of Britain's merchant seamen and fishermen in the war. It may pall a bit at times, for the admirable reticence of the average Britisher regarding his achievements is not always imitated by his chroniclers. The deeds which form the theme of the present volume are in truth beyond praise, and the tale of them needs little commentary. It is for this reason that the occasional facts and

concrete episodes the writer offers make us wish he had given more. Here are a few specimens:

"The gear of the trawler *Pelican* was just being hove in when a mine was discovered entangled in the warp. The winch was stopped just as the mine bumped—anxious moment—the ship's side. The skipper ordered all hands into the boat and to pull away. Remaining alone on board, with infinite care he worked to clear the mine, gently, very gently, unwinding the gear of the winch. The men lay on their oars at a safe distance and waited in suspense. At last the mine was released and the skipper paid out 120 fathoms of line. Hardly was it done when, having touched something, the devil-fish exploded, shaking the trawler from stem to stern and half filling the distant boat with water."

The *Strathearn*, with other trawlers, was attacked by a submarine. "While the shots were falling round, some of the crew shouted to Geordie, the skipper, 'Geordie, get the boat out.' Said Geordie, 'I'll see you in hell first! Fire up! If she's gaun doon, I'm gaun doon. Fire 'up! I think we hae a chance.' During this time Geordie was making toward another trawler, the *Commissioner* (armed), which had her gear down and seemed totally unconcerned. But as soon as the *Strathearn* passed her, and there was nothing between the submarine and herself, a blow with an axe cut her gear away, she swung round, and at the same moment, her gun appeared. . . . The fifth shot sent the submarine down in flames."

Here is the tribute of a destroyer commander, meeting a Channel trawler in a snow squall: "'They're It, absolutely It,' said the captain, 'No weather's too bad for 'em. They're our eyes and our ears. They know every blessed wave in the Channel, not merely as passing acquaintances, but they address 'em by their Christian names. They'll do anything, and go anywhere and chance the luck. They're just simple fishermen, but they run the whole show and they run it magnificently—guns, semaphores, wireless, everything! They live on kippers and tea, and I don't believe they ever go to sleep.'"

The book may be journalistic in treatment, but it is right in spirit. It brings home the fact that a nation's naval power must be calculated "in the broad terms of men and ships"—not her military navy alone, but her seafaring population and her merchant marine.

A. F. W.

"Finding and Stopping Waste in Modern Boiler Rooms." By Engineers of the Harrison Safety Boiler Works. Cloth, 9 inches by 7 inches; 276 pages; 213 illustrations; \$1.00. Philadelphia, Pa.

The saving of coal is the purpose of this practical handbook, which is addressed to power plant owners, managers, engineers and firemen. The preface states that such statements, tables, charts, etc., have been selected as were supported by experiments and tests, references being given wherever possible to the original authorities. The latter include many well-known engineers and writers in technical periodicals, also authors of papers before engineering societies, while the excellent bulletins on the utilization

of fuel issued during recent years by the United States Bureau of Mines have been freely drawn upon. Pains have been taken to compare statements and to check each source of information against others.

The work is divided into five sections, the first of which is about "Fuels," under which are considered the coals of the United States and their classifications, size of coal, coal sampling, proximate analysis, ultimate analysis, heating value of coal, ash and clinker, value of coal for steaming purposes, purchase of coal under specification, washing of coal storage and weathering of coal, coal measurement, oil fuels and gaseous fuels.

The second section is on "Combustion," taking up the chemistry of combustion air theoretically required, grates and grate surface, hand firing methods, thickness of fire, mechanical stokers and their operation, furnace temperature, furnace gases, clinker, draft, flue and stack proportions, draft required by stokers, mechanical stokers, draft gages, dampers, flue gas temperatures, flue gas analyses, CO_2 recorders, what CO_2 indicates, what CO indicates, air requirements and supply, preventing excess air, smoke and smoke prevention, burning oil fuel, burning gaseous fuels, and burning powdered coal.

The third section treats of "Heat Absorption," including heat transmission by conduction, convection and radiation, heat transfer from a fluid in a channel, heat transfer in economizers, air heaters and superheaters, improving heat absorption, relation between heating surface and boiler capacity, boiler setting, refractories and fire brick, soot, scale, softening feed water, and feed water heating.

The fourth section on "Boiler Efficiency and Boiler Testing" covers heat balance, heat absorbed by boiler, heat losses due to moisture in the coal, hydrogen, chimney gases, CO, combustible in the ash, moisture in the air, and unaccounted for loss, efficiencies, efficiencies with different coals, boiler capacity and efficiency, and boiler trials.

The fifth section on "Boiler Plant Proportioning and Management," discusses various arrangements of auxiliaries with regard to their effect upon feed heating, and also describes the Polakov functional system of boiler room management.

The book has been compiled by George H. Gibson, member American Society Mechanical Engineers, assisted by Percy S. Lyon, now captain of Coast Artillery. The proofs were read by Mr. Henry Kreisinger, who conducted for the U. S. Bureau of Mines many of the investigations quoted in the text.



NOTICE

The U. S. Naval Institute was established in 1873, having for its object the advancement of professional and scientific knowledge in the Navy. It is now in its forty-fifth year of existence, trusting as heretofore for its support to the officers and friends of the Navy. The members of the Board of Control cordially invite the co-operation and aid of their brother officers and others interested in the Navy, in furtherance of the aims of the Institute, by the contribution of papers and communications upon subjects of interest to the naval profession, as well as by personal support and influence.

On the subject of membership the Constitution reads as follows:

ARTICLE VII

Sec. 1. The Institute shall consist of regular, life, honorary and associate members.

Sec. 2. Officers of the Navy, Marine Corps, and all civil officers attached to the Naval Service, shall be entitled to become regular or life members, without ballot, on payment of dues or fees to the Secretary and Treasurer. Members who resign from the Navy subsequent to joining the Institute will be regarded as belonging to the class described in this Section.

Sec. 3. The Prize Essayist of each year shall be a life member without payment of fee.

Sec. 4. Honorary members shall be selected from distinguished Naval and Military Officers, and from eminent men of learning in civil life. The Secretary of the Navy shall be, *ex officio*, an honorary member. Their number shall not exceed thirty (30). Nominations for honorary members must be favorably reported by the Board of Control. To be declared elected, they must receive the affirmative vote of three-quarters of the members represented at regular or stated meetings, either in person or by proxy.

Sec. 5. Associate members shall be elected from Officers of the Army, Revenue Cutter Service, foreign officers of the Naval and Military professions, and from persons in civil life who may be interested in the purposes of the Institute.

Sec. 6. Those entitled to become associate members may be elected life members, provided that the number not officially connected with the Navy and Marine Corps shall not at any time exceed one hundred (100).

Sec. 7. Associate members and life members, other than those entitled to regular membership, shall be elected as follows: "Nominations shall be made in writing to the Secretary and Treasurer, with the name of the member making them, and such nominations shall be submitted to the Board of Control. The Board of Control will at each regular meeting ballot on the nominations submitted for election, and nominees receiving a majority of the votes of the board membership shall be considered elected to membership in the United States Naval Institute."

Sec. 8. The annual dues for regular and associate members shall be two dollars and fifty cents, all of which shall be for a year's subscription to the UNITED STATES NAVAL INSTITUTE PROCEEDINGS, payable upon joining the Institute, and upon the first day of each succeeding January. The fee for life membership shall be forty dollars, but if any regular or associate member has paid his dues for the year in which he wishes to be transferred to life membership, or has paid his dues for any future year or years, the amount so paid shall be deducted from the fee for life membership.

ARTICLE X

Sec. 2. One copy of the PROCEEDINGS, when published, shall be furnished to each regular and associate member (in return for dues paid), to each life member (in return for life membership fee paid), to honorary members, to each corresponding society of the Institute, and to such libraries and periodicals as may be determined upon by the Board of Control.

The PROCEEDINGS are published monthly; subscription for non-members. \$3.00; enlisted men, U. S. Navy, \$2.50. Single copies, by purchase, 30 cents; issues preceding January, 1918, 50 cents.

All letters should be addressed U. S. Naval Institute, Annapolis, Md., and all checks, drafts, and money orders should be made payable to the same.

SPECIAL NOTICE

NAVAL INSTITUTE PRIZE ESSAY, 1919

A prize of two hundred dollars, with a gold medal, and a life-membership (unless the author is already a life member) in the Institute, is offered by the Naval Institute for the best essay on any subject pertaining to the naval profession published in the PROCEEDINGS during the current year. The prize will be in addition to the author's compensation paid upon publication of the essay.

On the opposite page are given suggested topics. Essays are not limited to these topics and no additional weight will be given an essay in awarding the prize because it is written on one of these suggested topics over one written on any subject pertaining to the naval profession.

The following rules will govern this competition:

1. All essays published in the PROCEEDINGS during 1918, which are deemed by the Board of Control to be of sufficient merit, will be passed upon by the Board during the month of January, 1919, and the award for the prize will be made by the Board of Control, voting by ballot.

2. No essay received after November 1 will be available for publication in 1918. Essays received subsequent to November 1, if accepted, will be published as soon as practicable thereafter.

3. If, in the opinion of the Board of Control, the best essay published during 1918 is not of sufficient merit to be awarded the prize, it may receive "Honorable Mention," or such other distinction as the Board may decide.

4. In case one or more essays receive "Honorable Mention," the writers thereof will receive a minimum prize of seventy-five dollars and a life-membership (unless the author is already a life member) in the Institute. The actual amounts of the awards to be decided by the Board of Control in each case.

5. Essays are limited to fifty (50) printed pages in the PROCEEDINGS of the Institute.

6. It is requested that all essays be submitted typewritten and in duplicate; essays submitted written in longhand and in single copy will, however, receive equal consideration.

7. In the event of the prize being awarded to the winner of a previous year, a gold clasp, suitably engraved, will be given in lieu of the gold medal.

By direction of the Board of Control.

G. M. RAVENSCROFT,

Lieut. Commander, U. S. N., Secretary and Treasurer.

PRIZE ESSAY TOPICS

SUGGESTED AT THE INVITATION OF THE BOARD OF CONTROL

BY

THE PRESIDENT OF THE NAVAL INSTITUTE, THE SUPERINTENDENT
OF THE NAVAL ACADEMY, THE PRESIDENT OF THE NAVAL WAR
COLLEGE, AND THE COMMANDERS-IN-CHIEF OF THE ATLANTIC,
PACIFIC AND ASIATIC FLEETS.

- "The Place of the Naval Officer in International Affairs."
- "The Evolution of Naval Doctrine from National Character."
- "The Training of Enlisted Personnel to Produce Modern Man-o'-
Warsmen: (a) Military Training; (b) Moral Training;
(c) Education."
- "The Organization, Employment and Training of Reserve Fleets
and Flotillas."

LIST OF PRIZE ESSAYS

"WHAT THE NAVY HAS BEEN THINKING ABOUT"

1879

- Naval Education. Prize Essay, 1879. By Lieut. Commander A. D. Brown, U. S. N.
NAVAL EDUCATION. First Honorable Mention. By Lieut. Commander C. F. Goodrich, U. S. N.
NAVAL EDUCATION. Second Honorable Mention. By Commander A. T. Mahan, U. S. N.

1880

- "The Naval Policy of the United States." Prize Essay, 1880. By Lieutenant Charles Belknap, U. S. N.

1881

- The Type of (I) Armored Vessel, (II) Cruiser Best Suited to the Present Needs of the United States. Prize Essay, 1881. By Lieutenant E. W. Very, U. S. N.
SECOND PRIZE ESSAY, 1881. By Lieutenant Seaton Schroeder, U. S. N.

1882

- Our Merchant Marine: The Causes of Its Decline and the Means to Be Taken for Its Revival. "Nil clarius aquis." Prize Essay, 1882. By Lieutenant J. D. Kelley, U. S. N.
"MAIS IL FAUT CULTIVER NOTRE JARDIN." Honorable Mention. By Master C. G. Calkins, U. S. N.
"SPERO MELIORA." Honorable Mention. By Lieut. Commander F. E. Chadwick, U. S. N.
"CAUSA LATET: VIS EST NOTISSIMA." Honorable Mention. By Lieutenant R. Wainwright, U. S. N.

1883

- How May the Sphere of Usefulness of Naval Officers Be Extended in Time of Peace with Advantage to the Country and the Naval Service? "Pour encourager les Autres." Prize Essay, 1883. By Lieutenant Carlos G. Calkins, U. S. N.
"SEMPER PARATUS." First Honorable Mention. By Commander N. H. Farquhar, U. S. N.
"CULIBET IN ARTE SUA CREDENDUM EST." Second Honorable Mention. By Captain A. P. Cooke, U. S. N.

1884

- The Reconstruction and Increase of the Navy. Prize Essay, 1884. By Ensign W. I. Chambers, U. S. N.

1885

- Inducements for Retaining Trained Seamen in the Navy, and Best System of Rewards for Long and Faithful Service. Prize Essay, 1885. By Commander N. H. Farquhar, U. S. N.

1886

- What Changes in Organization and Drill Are Necessary to Sail and Fight Effectively Our Warships of Latest Type? "Scire quod nescias." Prize Essay, 1886. By Lieutenant Carlos G. Calkins, U. S. N.
THE RESULT OF ALL NAVAL ADMINISTRATION AND EFFORTS FINDS ITS EXPRESSION IN GOOD ORGANIZATION AND THOROUGH DRILL ON BOARD OF SUITABLE SHIPS. Honorable Mention. By Ensign W. L. Rodgers, U. S. N.

1887

The Naval Brigade: Its Organization, Equipment and Tactics. "In hoc signo vinces." Prize Essay, 1887. By Lieutenant C. T. Hutchins.

1888

Torpedoes. Prize Essay, 1888. By Lieut. Commander W. W. Reisinger, U. S. N.

1891

The Enlistment, Training and Organization of Crews for Our Ships of War. Prize Essay, 1891. By Ensign A. P. Niblack, U. S. N.

DISPOSITION AND EMPLOYMENT OF THE FLEET: SHIP AND SQUADRON DRILL. Honorable Mention, 1891. By Lieutenant R. C. Smith, U. S. N.

1892

Torpedo-boats: Their Organization and Conduct. Prize Essay, 1892. By Wm. Laird Clowes.

1894

The U. S. S. Vesuvius, with Special Reference to Her Pneumatic Battery. Prize Essay, 1894. By Lieut. Commander Seaton Schroeder, U. S. N.
NAVAL REFORM. Honorable Mention, 1894. By Passed Assistant Engineer F. M. Bennett, U. S. N.

1895

Tactical Problems in Naval Warfare. Prize Essay, 1895. By Lieut. Commander Richard Wainwright, U. S. N.

A SUMMARY OF THE SITUATION AND OUTLOOK IN EUROPE. An Introduction to the Study of Coming War. Honorable Mention, 1895. By Richmond Pearson Hobson, Assistant Naval Constructor, U. S. N.

SUGGESTIONS FOR INCREASING THE EFFICIENCY OF OUR NEW SHIPS. Honorable Mention, 1895. By Naval Constructor Wm. J. Baxter, U. S. N.

THE BATTLE OF THE YALU. Honorable Mention, 1895. By Ensign Frank Marble, U. S. N.

1896

The Tactics of Ships in the Line of Battle. Prize Essay, 1896. By Lieutenant A. P. Niblack, U. S. N.

THE ORGANIZATION, TRAINING AND DISCIPLINE OF THE NAVY PERSONNEL AS VIEWED FROM THE SHIP. Honorable Mention, 1896. By Lieutenant Wm. F. Fullam, U. S. N.

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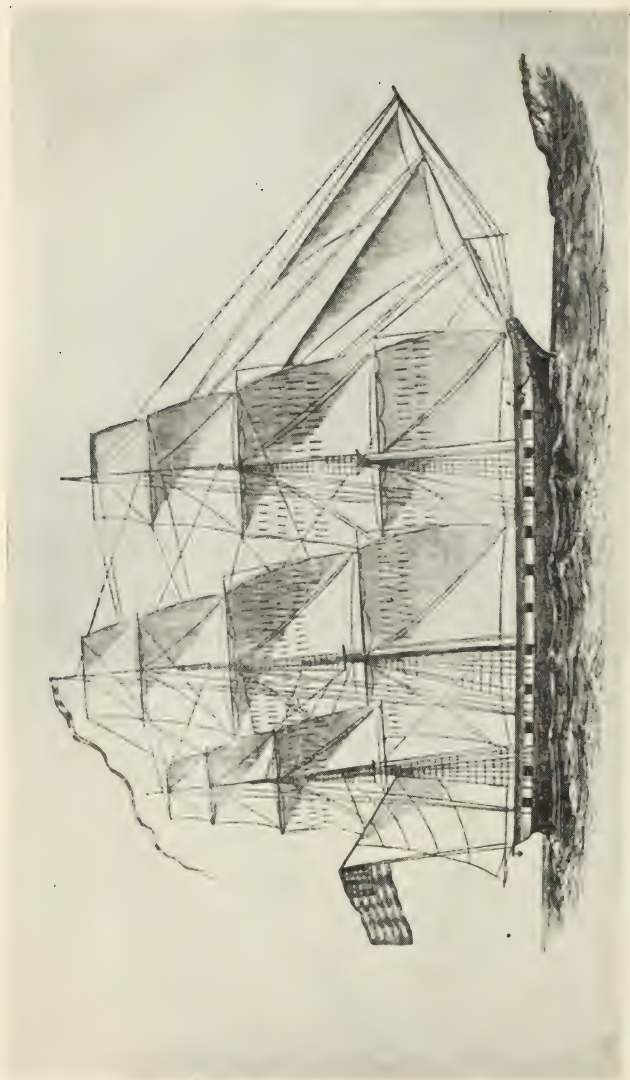
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THE PREPAREDNESS OF THE FUTURE

By COMMANDER H. O. RITTENHOUSE, U. S. Navy (Retired)

Motto: "When a strong man armed keepeth his palace,
his goods are in peace"

PEACE AND PEACE

Words like any other code of human signals are subject to misinterpretation. It is sometimes possible to express the same thought by different symbols, and it also frequently happens that the same symbol may be interpreted in more than one way. Every page of the dictionary gives evidence that words in general are not sharply outlined in significance, but rather seem shrouded in a penumbra of greater or less area by which they shade off into various and sometimes almost contradictory meanings. In a purely scientific discussion we endeavor to make meaning clear by conventional definitions. But great social problems involving complex human elements do not readily yield to the scientific method, and because of this we use terms in their ordinary acceptance, trusting that we may not deceive ourselves or mislead others. The results are sometimes unfortunate.

The word *peace* is one that may easily mislead us and, because of it, reasoning has not always been clear and conclusions not always justified. One very general understanding of the word peace is simply the non-existence of a state of war. And by *war*

we here mean armed conflict with public enemies, foreign or domestic. In this sense the word takes no account of other struggles, hardships and dangers in which we might be involved. That is, to have peace is simply not to be at war. Whenever this kind of peace is desirable it is the easiest of all things to obtain. It always takes at least two to make a fight. Refuse to be one of the two and there is no fight, and therefore peace. Peace, in this sense, is always at hand, whether with the brute who violates a home, the mob destroying property and life, or the nation that would overpower us. This is the peace of non-resistance. It is a very natural thing indeed, but a radical error, for the people of a country who have enjoyed great happiness and prosperity in normal times, to believe that these blessings are the direct result and the deserved reward of not having armed public conflicts. To such minds peace presents itself as a *cause*, happiness and other blessings the *effect*.

Now there is another and a very different idea conveyed by the same word. Peace in this second sense is distinctly a *result*. It is the tranquillity and satisfaction of both body and mind that follow right conduct and worthy effort. It is the harvest and fruitage after the toil of sowing and reaping; it is the enjoyment of health and happiness that comes from a life of temperance, self-denial and fair dealing. Collectively it is the aim of civilization, the desire of all nations, the hope of the world. It can never be obtained by inaction and non-resistance. On the contrary it must be purchased at the cost of struggle and sacrifice. The contest, for individuals and nations alike, is waged in both material and moral fields. Food, shelter and clothing must be obtained, rivers crossed, mountain barriers overcome, and disease eliminated. Selfishness, greed, poverty, vice and crime are to be suppressed and human relations established on the basis of universal justice. Such is the stupendous program that faces mankind. It is not of his choosing and it cannot be evaded. The plan of action is the task of true statesmanship, and the battle itself must be fought by brave men who flinch at no hardships, and who will endure no wrong. We cannot hope to name the day of complete victory. We press on to closer and closer approximations, sustained by the knowledge that every hard-earned advance brings its commensurate reward. Such peace is an end and not a beginning, a consequence and not a cause.

It is certain that many sincere and well-meaning pacifists are mentally confused by failing to distinguish between these two very different meanings of the same word. They mistakenly believe that from the sickly peace of non-resistance will immediately issue the rewards reserved for those only who make heroic struggle and sacrifice for righteousness.

THE NORMAL LIFE, WAR AND PREPAREDNESS

In spite of the fact that history shows an almost unbroken record of wars, we are inclined to regard a state of war as exceptional to normal life, and we even cherish the hope that the exceptions are rapidly becoming more rare. When such view is entertained, it is inevitable that preparation itself will be regarded as exceptional, likely to be unnecessary and, at the best, an unprofitable investment. Thus we become slow and reluctant to take action, and our measures are sporadic and inadequate.

If however we look more closely into what we have called the normal life, it will be clear that contests with armed enemies constitute no such marked exceptions as we have been accustomed to believe. Not only do such contests come with a frequency that should keep us ever alert, but the normal life itself involves hardships and sacrifices qualitatively on a par with war, and often closely approaching it in volume and intensity. Year by year, fire and flood demand their toll of life and property and we must toil and rebuild anew. Tempests, earthquakes and disease decimate our ranks. Men are killed and crippled in factories and mines as in battle. Immorality, vice, crime and injustice double our burdens individually and collectively. There seems no escape from these evils in either time or space. Suffering and tragedy find their way into our homes as readily in times of so-called peace as in time of war. The normal life is a continual challenge to a warfare that demands the same virtues of courage, endurance and sacrifice that are associated with public armed conflicts. It seems more logical therefore to regard war as one of many items in a long series of evils, rather than as a distinct, exceptional experience. It may indeed be the culminating item among these evils, but an item nevertheless with many marks that establish it in the common class. War and peace, in fact, are but extreme phases of continuous national struggle. When the struggle is bitter and severe between national antagonists, we call it war; when it is

less violent and confined to coping with adverse national forces in providing human needs, we call it peace. In passing from a state of peace to a state of war we do not exchange one kind of burden for another; we superpose the additional burdens of war upon the already existing ones of peace.

Since then war is not fundamentally differentiated from the major evils of the normal life, but the burdens and struggle in greater or less degree are ever with us, it is manifestly unwise to confine our ideas of preparedness to the narrow scope of purely technical military needs. It is not enough to determine and supply the number of horses, men, weapons, ships, aircraft, etc., that may be needed. Thorough preparation will, first of all, take cognizance of the vital factors in the normal life and so organize men, material and resources that in the event of war not only will the military branches be ready to operate effectively, but the entire nation will be prepared to contribute its full measure of support, power and endurance to the struggle. The vital processes of the ordinary national life must still be sustained under greater load.

Such fundamental nation-wide preparation might more properly be regarded as a preparation for peace. Its very existence averts aggression and discourages attack. It looks to no time serving, makeshift or fortuitous peace, but through painstaking constructive effort to the durable peace upon which the faith of civilization is fixed.

It is keeping the nation "fit" in all respects for its normal tasks precisely as an individual should at all times keep his body and his business affairs in the highest degree of efficiency. Under such conditions we enjoy the double advantage of realizing the best that peace affords and at the same time providing the best possible preparation for all the greater adversities to which nations are subject.

Even if the purely military elements are assembled in satisfactory number and quality they will not avail in a contest where endurance is the decisive factor. How far would the big fist and strong arm of an individual carry him in any physical struggle if the vital organs of his every-day existence were weak, diseased and undeveloped? Experience is indeed a dear teacher; but her lessons are worth the price if they can be learned no other way. Has our short experience in the present war yet taught us that success depends primarily and ultimately upon such things as

bread, wool, coal, gasolene and contented field and factory labor? These are at all times the common denominators of life, and it is plain that victory hinges upon their adequate supply no less than upon the purely military elements at the trenches.

The principle involved has equal application in the spiritual domain where the issues of life are so largely determined. The moral qualities of unselfishness, courage, sacrifice and endurance, essential to success in the minor but inevitable contests of life, are the identical ones that are indispensable in war. It is not alone those at the front who must be dominated by an unconquerable spirit that fears defeat more than death, but those at home as well whose equal duty it is to serve and bear burdens of anxiety and grief without flinching from the yoke. Defeat by superior force of arms may be unaccompanied by disgrace; but no greater tragedy can befall a nation than to suffer defeat or submit to oppressive terms through speculative profiteers, purchasable treason, or weak-kneed pacifists behind the lines, while her armies are not overcome. Thus the moral soldierly qualities upon which we rely for success in war are not of peculiar or mysterious origin, but are recognized as the homely virtues we undervalue and neglect in our common life.

We cannot fail to note that the necessity for such basic preparation is equally imperative, whether wars go on or cease. If they continue, the necessity is plain, for it is the life of the nation that must sustain the war, and this life must be kept at its best. But if the miracle should be wrought, and armed contests cease, it seems equally clear that the ambitions of men and the competition of nations will merely result in establishing the contest upon a more pacific plane, where the conditions of dominancy and survival will require precisely the same, or even a more elaborate, preparedness. The prospect, however, for such an attractive régime seems far from bright. If the world was deluding itself with the dream of an idle, selfish, indulgent peace, to be enjoyed without sacrifice and without the power that comes from physical and moral struggle, it has been rudely awakened. He is a bold prophet indeed who predicts that voluntary and general disarmament will be written in the agreements of the council table, and that nations will give willing consent to measures that restrict their means of self-defence.

Following the war there will be a long period of national readjustment that logically must take the direction of more highly-

wrought economic and industrial organization than we have been accustomed to in the past. The financing of the war is creating an indebtedness that will bear heavily upon the people, and the task of easing the load as much as possible and securing the full measure of justice to all classes will severely test the strength of our democracy. Even if it were desirable, it will be impossible to go back to ante-war conditions and methods. There will be hardship and disappointment for many, and the entire national body must learn to sacrifice accustomed margins of profit to the widest and fairest distribution of the common proceeds of united endeavor.

Other nations will face similar conditions, and in the ensuing rivalries for advantage, rivalries which are, in fact, the unformulated determination to survive, success will rest with those who can best organize, sacrifice and endure.

By preparedness, then, we have in mind that condition of national being that will enable us to apply at all times, to the utmost advantage, the powers and resources indispensable to free and happy existence. When we reflect that our human lot carries no exemption whatever from the vigilance and activity necessary to the welfare of all animated life, it becomes evident that adequate preparation must be broad in scope and fundamental in character. It would be a serious error therefore to conceive of preparedness as something pertaining exclusively to a state of war. But we would be culpable indeed if we minimized the importance of such special preparation. It is understood of course that preparedness includes the development and training of naval and military forces, and the skillful use of the best weapons and devices that invention can produce. Advocacy of these measures will be assailed as "militarism" by timid souls who shrink from the sound of any word that suggests the suffering, the sacrifices or even the virtues of war. Their specious arguments would destroy effective defence of rights, liberties, homes and heritage against the outlaw and oppressor.

Manly prowess, the ability to defend oneself and one's family, the power to uphold right and suppress wrong is a supreme virtue. It is only its perverted application that deserves condemnation. This is no less true of a nation than of an individual, and it is only in the unholy purpose to which national power may be applied that militarism becomes a reproach.

MATERIAL ELEMENTS OF PREPAREDNESS

A study of human activities may be resolved into a consideration of the basic elements called matter and force.

We transform and transport material things through the agency of the natural forces that we have learned in some measure to control. When force acts upon matter, power is manifested; and when we so control matter and force that the application can be made at the moment of our choice, we have potentiality; that is to say, power may be active or latent.

Fundamental preparedness therefore involves a study of all the material things that affect our well-being, together with the means at our disposal for adapting and applying them to our use. These material things are of great variety, covering different fields of usefulness and having wide ranges of value according to our needs and the abundance or paucity of supply. They range from such vital matters as food products to trivial conveniences; from sand to productive soils; from grasses to forests; and from water to the valuable ores. Of these the study should embrace our own available supplies and substitutes and the sources from which important deficiencies can be depended upon. It should develop the normal consumption of the important items and the increased consumption that may be demanded by war. It should include measures of conservation and limitation of output, in order that our national substance may not be wasted in riotous living to the detriment of our descendants, but rather that each successive generation may be a tenant for life, to use without waste, while the estate continues unimpaired.

Such study would include likewise a survey of all important industries and of the available natural powers applicable to the desired transformation and transportation of material. This covers such items as agriculture, commerce, mining, manufacturing and distribution. It would cover the full possibilities and the wise development of our water supply for irrigation, for inland routes of transportation, and for general power purposes. It would cover all experimental work looking to the application of winds, currents, tides, volcanic heat, solar radiation, etc., as useful agencies of power. It would cover road building in all its branches, for traffic by rail, auto cars and farm wagons.

Such itemization is in no sense complete, but is illustrative only as indicative of the purpose in view. Efficient and thorough work

of the kind suggested could be accomplished only by a body of experts with ample means of collecting data and skillful in the compilation and use of statistics. They should be men of high intelligence and broad information regarding the policies, resources and restrictions of the leading nations of the world; and should be able to formulate the policies and measures best adapted to advance our own national interests. They should discover the times when competition between great industries has outlived its advantages, and should devise measures to replace it by co-operation. In a word, they should be national business experts holding the same relation to our government that the modern efficiency expert holds to the corporation he serves. Such a body might be called a Commission of National Resources and Efficiency. It should be under the immediate direction of a Department of Government, and its data, recommendations and reports be available for executive or legislative action and for private enterprise.

While war needs would be fully embodied in the scheme, they would not constitute the chief motive for the activity of the Commission. Such motive must be found in the desire to meet the needs and forward the aims of all the people in normal times, in a way at once efficient and harmonious. Such motive would spring from the knowledge that a contented people, living on the highest plane of progress and efficiency, is at all times fundamentally ready for any adversity and in the event of war need only take up its weapons. In a supreme struggle, neither individual nor nation can hope to improvise basic conditions of vitality and power that command success. These are of slow growth, the product of patience, and wisdom, the essential attributes of the statesman.

The imperative demands of the present war have led to the formation of numerous councils and boards whose functions are not always clearly defined and which may overlap and even duplicate each other. Constituted hurriedly in the hour of necessity, they are make-shifts to tide us, if possible, over a crisis. That we grasp so spontaneously at these means is the proof positive that such need as they endeavor to supply is real and urgent and should be anticipated before the day of trouble.

Upon such carefully prepared data the more specialized public and private enterprises could be developed to advantage. Foremost among these would come the specific preparation for national defence. Coast defence, inland water routes, rail and automobile

routes, and aviation stations would be planned, and provision made for the manufacture and storage of war material to the minutest detail. This is peculiarly the work of our military experts, both army and navy, and may safely be left in their hands as heretofore. While it is not the purpose here to enter into specific professional matters, the temptation is irresistible to suggest aeronautics as the most important field in which the great war developments of the future will be made.

Our agricultural interests are of vast importance as fundamental to national well-being, and they demand the wisest provisions for maintenance and development. Food and clothing are imperative necessities. As compared with older nations, we are poor farmers and gardeners. Much productive land is untilled while ill-nourished families cling to city tenements. We are wasteful of our crops both in field and home after we have grown them. We exhaust the natural fertility of our soils and abandon them to seek others rather than restore them by careful husbandry. Of course, such practice is largely due to the fact that we have not yet fully possessed ourselves of the bounteous natural supplies of a new and rich country. We still are "living in clover." But these conditions are already changing and we must soon practice the economies of older peoples. Public expenditure to assist those who produce our food and to encourage people to find their living from mother earth is wise investment. In the last analysis the social structure rests heavily, if not wholly, upon "the man with the hoe."

As another example of important subject matter, we may mention international commerce. It has ever been a most fruitful cause of war. The "permanent" peace of the world so hopefully predicted by some, so earnestly desired by all, will be measurably nearer when the vexatious questions arising from colonial enterprise and commerce are brought to unselfish national agreement. The big obstacle in the problem is contained in the word *unselfish*.

Commerce itself presents to our minds quite different aspects according to the phases under which it is considered. If we have in mind a collection of friendly nations, without clashing ambitions, whose peoples are content with life within their respective boundaries, we can conceive of commerce among them as a most pacific and beneficent institution, whereby desirable commodities

are merely interchanged without significant profit, and the only expense is the fair compensation to the carrier.

But commerce as it is actually practiced by the leading nations of the world presents a very different picture. The nations are by no means all friendly. They have conflicting aims. The people are not all content within their own borders and seek expansion by colonization. Some nations are strong, others are weak. Some are civilized, others untutored. There are large areas of the continents and some of the islands yet offering abundant natural resources of great value that cannot be appreciated, used or defended by the weak people occupying them. Greed cannot resist these temptations and, under the camouflage of "development," "progress," or what not, commercial enterprises are organized. The motive that actuates the leading spirits in these large transactions is financial gain. They endeavor to trade at the utmost advantage to themselves and eventually get something for nothing. The profits are brought home partly to be enjoyed by themselves and partly to be distributed among the people who convert raw material and distribute the manufactured products. When all works well this brings about a condition called "prosperity." All the great nations, of course, want prosperity, and its chief source is from the outside. In fact, to have general prosperity in a nation by inside trading only is about equivalent to lifting oneself by the bootstraps. Governments therefore encourage commerce notwithstanding the armed conflicts to which it so often leads.

The material force which, down to the present time, has steadied and regulated commerce with more or less justice, has usually been in the hands of one or more of the nations, dominant for the time being, and its exercise has been termed "control of the sea." The advantages to those who exercise this control render it a prize that makes peace always unstable. The world is now seeking relief from this situation by some new program sometimes referred to as "freedom of the seas." The term as yet has no settled significance and the program is but embryonic. Freedom of any kind, however, is never absolute. There is no valid liberty or freedom without law. Freedom of the seas, whatever it may come to signify, must in some way be supported by material force to maintain our conventions; and if such support, or control, is to be any improvement upon past conditions, it would seem to lie in

concerted arrangement among a sufficient number of the great powers to make resistance on the part of the others futile.

Our country will demand its equal part in control and in participation of the world's commerce. It may go further and demand a world-wide open door with special privileges to none. The control will be represented by naval force, and our participation must be as active carriers as well as mere profiteers. Without the means of thus serving ourselves, we would easily be cut off in an international crisis. Our economic and industrial conditions make it practically impossible for us to compete naturally with the cheaper labor of foreign nations in the building and running of ships. We must therefore have direct government aid in these matters to safeguard the vital interests involved. Whether this aid is in the form of open or disguised subsidies or in the form of direct government operation is of minor consequence. The essential matter is the freedom and security that only our own ships, manned by our own seamen, can give.

It would be quite impossible in the compass of a brief paper to even outline the more important items of a material nature bearing directly upon the strengthening of our country. The items themselves are abundant and need not be listed here. The important point however is that it is *during* the normal life, and *for* the normal life that these provisions should be made.

If there has been any such comprehensive, careful planning, having in view the general welfare, it has not been made operative. Individual enterprise has been the usual procedure and the chief reliance. Such means may be the natural mode of development in a new country, thinly populated and offering attractive opportunities to men of courage and action. But there is neither system nor method in such means. The results are hurried legislation on the appeal of lobbyists, conflicting interests and claims, the development at times of suicidal competition and direct robbing of the people through criminal transactions in corporate stock. As the population becomes more dense and the common interests are seen to suffer by jarring conflicts, the necessity of method and system is obvious.

THE HUMAN ELEMENT IN PREPAREDNESS

Wars may be won in the future, as sometimes in the past, by the longer purse, or again by the larger battalions. These are indeed desirable advantages and, other conditions equal, would naturally

be decisive. But oftentimes "the race is not to the swift, nor the battle to the strong," nor can victory always be purchased by gold. Material things for the most part are of themselves inert or passive, and chance is an unreliable friend and a treacherous foe. But so far as control is possible and chance can be eliminated, the superior factor in war as in other fields of human endeavor, is man himself, the living element, the embodiment of will. In him is both matter and force so intimately compounded that the dividing plane between them, if indeed there be one, eludes our scrutiny.

In the general preparation for national fitness which has already been urged, and in the special professional preparation for defence, we recognize the full importance of material resources, weapons and skill; and in their development and application we cannot be too progressive. But important as these are, they yet are secondary. Outclassing them and prior to them in logical sequence comes the quality of citizenship that composes the nation. A nation weaker than another in the essential virtues of mankind is under initial disadvantage that will ultimately manifest itself in defeat, whatever the nature of the contest. It will be surpassed in the rivalries or peace and humbled in the strife of war. It is the mysterious power in man himself that fashions material, enslaves the forces of nature, and wills into realization the most daring visions. Thus the richest asset of any nation, surpassing in value its wealth of forests, minerals, flocks and herds is its human composite of body and mind.

But the output of humanity is not a uniform product. Individuals vary in physical and mental traits and in their powers and capacities, and social units display equal differences. East and West have their antithetic civilizations, and the narrow life of the Esquimau has little in common with the varied interests and luxuries of the temperate zones. Habits of living, occupation, food and general environment have their certain effect upon both body and mind, while the combined influences of religion, ethical and social ideals, and the specific training of youth, have at least equal force in the formation of national manhood.

We seek the highest standard of manhood. We want the healthiest bodies and the soundest minds possible. In athletic contests we all know the advantages of skill and the necessity of training; but do we realize that for supreme success the contest-

ants themselves must be selected individuals? Superior physical and mental qualities manifesting themselves in strength, weight, will and endurance are necessary to produce a champion. "We cannot make a silk purse of a sow's ear," neither do "men gather grapes of thorns." Little use indeed of training an anemic, undeveloped tenderfoot for events in the heavy-weight class.

It is the essential manhood of our nation, the human stock of physical and mental power, by which, for weal or woe, we shall write our historical record. Nature and circumstance have combined to give us domain and resources beyond ancient realization or dream, and if we fail of honorable achievement, our fate will be the deserved consequence alone of weakened and vitiated manhood. If we aspire to the worthy success that constitutes the glory of great nations who have preceded us, and hope to enrich posterity by a still more enlightened and beneficent civilization, we must, before all else, establish our foundations in physical and moral integrity.

By personality we have in mind the qualities, attributes and conduct that distinguish an individual from his fellows. It embraces in particular his physical and mental traits. By nationality we have the corresponding conception of the qualities, attributes and traits that distinguish a nation from other nations. But as a nation has no identity except as a composite of its individual elements, so nationality, or national character, can be apprehended only through the medium of the individuals composing it.

On this basis is our national character satisfactory to us? Is it of high order? When our individuals are compared class by class with those of other nations, can we claim superiority in physical health, power, vitality and endurance? Do we surpass them in fundamental virtues, in moral rectitude and in the appreciation of unselfish social justice? Are we more skillful of hand, or more clever of intellect? When we consider among us, on the one hand, the weak, the diseased, the immoral, the criminal, the ignorant, and the insane, and on the other the strong, the healthy, the virtuous, the good, and the intelligent, do the desirable qualities so predominate that we are justified in complacent confidence? Moreover, and more significant, do we know in which direction the scales are turning in these vital matters? Are we improving or declining in the elements of strong and vigorous citizenship? While current statistics of disease and insanity and

the criminal records of our large cities furnish material for grave reflection upon these questions, it is not the purpose here to discuss them, but simply to engage attention to their serious importance. It is as impossible for a nation, as for an individual, to enter upon a profligate, self-indulgent and pleasure-seeking career and escape the vices that spell physical and moral decadence.

To develop and maintain the highest standard of physical, mental and moral manhood in its citizenship is the vital problem of any self-respecting, self-reliant, forward-looking nation. Its correct solution will be verified in the answer of power and righteousness, without which no nation can long endure, as the records of both prophecy and history abundantly testify.

THE TRAINING OF YOUTH

The problem centers in the training of children and youth, the natural, if not the only possible, stage of life wherein manhood can be effectively moulded. In what follows, the endeavor is to emphasize the important aims, point out difficulties and manifest errors in present-day practice, and offer remedial suggestions. A human personality will be regarded as a compound of body and mind. The term mind, therefore, is used in its most comprehensive sense to embrace everything that is not obviously material. Thus the emotions, the will, intellect, memory, etc., are departments or phases of mind, and when mentioned the reader will conceive of them as parts only and not the whole. Those who believe in a trinity of elements including what is sometimes spoken of as spirit, or soul, are asked to shelter this also under the general designation of mind. This is merely a convenient definition to secure common understanding and is not advanced as a theory to be defended.

From the viewpoint of natural development, physical health is the foundation of successful life. Man is manifest to us first as an animal. Even the infancy of the individual mirrors to us the infancy of the race, as we see the babe come into the world with adequate physical equipment before it can manifest self-consciousness.

Robust physical health, every organ and every cell vibrant with life and energy, untouched by disease, represents to our thought the first requisite of perfect manhood. Starting with this endowment alone it is possible to forecast all the triumphs of civilization

Thus human power and human happiness, the pursuit of which is our undeniable heritage, rest primarily upon physical wholeness or health.

But mind and body are combined to produce a mysterious unity. Their mutual reactions are so certain and complete as to suggest an ultimate identity. Priority cannot be asserted with confidence. There are those who influence and cure physical ailments by mental treatment. Physicians habitually seek first of all to inspire hope and cheerfulness in their patients. On the other hand, it is an every-day occurrence to remove mental defects by scientific surgery.

If, therefore, we could attain an ideal perfection of body and an ideal perfection of mind, the combination would be ideal manhood. Thus are we led to the homely truth and simple program upon which great nations of the past were reared. In the training of youth no clearer, simpler, nor more comprehensive expression of aim has ever been formulated than the classical maxim, "A sound mind in a sound body." Upon what other or more stable foundation can a nation hope to endure in goodness and power than vigorous bodies, untainted by disease, and sound minds free of disorder and vice?

Any misgivings as to the reasonableness of these conclusions are quickly dissipated in the clear light of history. In Greece, for example, youth were trained physically and morally in their homes by parents and in the camps and gymnasiums by teachers. The body had its special discipline; pride in physical excellence was encouraged and its attainment rewarded. The mind was softened and harmonized by music and enlarged and made sympathetic by memorizations from the poets. From such simple methods resulted a civilization that still furnishes many of the standards of modern culture.

Rome adopted much of the Greek method and fortified it by strengthening the discipline in the home where the father had almost absolute authority over his children. Obedience to parents and to the state was accounted among the highest virtues, and respect for the law pervaded the empire from capital to remotest province.

Possibly the most striking illustration is found in the Hebraic records. The rules established by Moses for the upbuilding of his people were characterized by the stress laid upon physical and

moral purity. Cleanliness of body and care in the preparation of food were balanced on the spiritual side by a moral code so essentially fundamental and satisfactory that succeeding social systems have found no better. By the insistent training of children in these elemental virtues, under conditions precluding the possibility of anything like modern books or schools, a body of slaves and rude peasants, wanderers of the desert, was transformed in a few generations into an organized nation that produced political leaders, statesmen and poets whose influence yet remains a most potent factor in Western civilization.

To master the horse, to use their weapons, to speak the truth and to honor womanhood; such was the basis upon which princes were trained in the days when knighthood was expressed in terms of courage, service and loyalty. Strong physical constitutions, disease resisting, and wholesome minds dominated by virtue, have ever been and will continue to be the basis of human power. As naturally and as certainly as a good tree in good soil produces its wealth of foliage and fruit, so will come spontaneously from these elements of manhood the fruitage of all human excellence; statesmen, artists, poets, warriors, philosophers, and all else that may be demanded by worthy aspiration. Without such foundation, individuals and nations, alike and together, suffer the fate of the house built upon sand.

It is not without significance in this connection that, while fundamental training has been neglected almost to the point of abandonment in our civil public educational institutions and is fast disappearing in the home life of our city masses, its vitality has been preserved through the unbroken line of military necessity. Military authorities from the most ancient times, in their endeavor to develop human power, have realized that it is based on health and character. The benefit and virtue of all military training lie in these things first, and only secondarily and incidentally in the rapid movement of groups and the skillful use of weapons. It is because of its efficiency that such training is used by military men. No one claims that it is the best because it is called military; but it is military because it is the best.

In face of these facts our leaders neglected sound preparation because of fear of "militarism," and our educational authorities carefully withdrew their sacred gowns from contact with military training. Ignorant alike of its methods and virtues, they de-

nounced it as depressive and brutalizing, while the records overflow with the testimony of the deep humanity, the nobility of character and the heroic sacrifice that have ever been the product of soldierly training on land and sea. Strange, is it not, that when the impact of actual war disturbs their placid content and they realize the need of supreme effort in both the physical and moral domain, they forsake their intellectual idols and embrace the principles and methods of their lifelong condemnation! Yet these very principles are as indispensable and potent for the needs of peace as for the victories of war.

That military training develops the highest appreciation of moral values is the verdict of history as we scan the lives of military men. Contrast of the exceptional with the general record makes the truth more vivid. The pages of these proceedings themselves support the contention. The most cursory reading of the various articles published during the last 10 years relating to preparation and success in war, will show them shot through and through with the importance of the moral element, and it is doubtful if they can be matched in this regard by the corresponding output of any other purely secular institution.

There are innumerable factors involved in the development of a civilization, but among them are three institutions whose influence is, in large measure, determinative. These are the church, the home, and the school. These stand pre-eminent as moulding forces of social character and progress. From the religious domain are drawn those forces that mellow and vitalize our spiritual natures and quicken our sensibilities to the impress of right and wrong. From the home we derive basic knowledge and experience of what contributes to our physical welfare. We here acquire also the lessons of obedience, respect for parents and for the winnowed wisdom of experience, the entailed heritage of the ages. From our schools we rightfully expect knowledge, intellectual development, respect for law and authority, and the formation of habits embodying the accepted virtues.

Regarding these institutions, it is plain that the vital matter to consider is their ultimate donation of beneficent impress which is but crudely and imperfectly listed above. We scrutinize their product and have but little concern with their forms and functioning. These are often subject to radical changes which cannot always be credited as progress. Religious thought and expression

change with the generations ; home life is one thing in the country and another in the city, and varies in both ; while the principles and practice of public education are hopelessly unsettled. But whatever the external form or internal mechanism of these institutions, they must be judged by their results. The acid test of their worthiness is the contribution they make to the physical and moral health of the nation. If they are not working successfully to the common purpose of endowing childhood and youth with strong bodies and sound, disciplined minds, their essential mission will fail, whatever spectacular success they may seem to achieve.

Adequate review of these great institutions is a task concededly too vast and difficult to be undertaken here. But there are some outstanding facts regarding them worthy of notice that have direct bearing upon their individual and collective efficiency. The church does not hold the influence over the people it enjoyed in the earlier life of our nation. This is more particularly true in our large cities, where a pleasure-loving, self-indulgent element and a developing attitude of skepticism have weakened its capacity for service. The Sunday schools are loosely held together by entertainment rather than instruction, and at the best but little can be accomplished in a brief session once a week.

Industrial conditions and social tendencies have conspired to the rapid development of large cities, and for multitudes of children in them there is no real home life or home discipline. Their domiciles are unattractive and often uncomfortable abodes, whose most serviceable function is to provide a sleeping place. Conditions of employment deprive the children of paternal supervision. Many see their fathers only at infrequent intervals. The mother, burdened with household duties, is precluded from efficient care of her offspring, and the children live and are brought up on the street. The family, as the unit of social development, has here dissolved into neighborhood life, colony life, or gang life. These natural street associations constitute, virtually, a new social order, unregulated as yet by any adult agency. This uncontrolled street life and its criminal consequences stand in menacing contrast to the virtuous homes upon which our ancestors founded the nation.

Our institutions of learning, both public and private, are the result of a development that has been far too rapid for the establishment of well-digested systems of training based on wise

national policy. The outstanding features to notice are first, the marvellous influence which these institutions have acquired over our national life. Partly by displacement and partly by absorption they have established undisputed primacy over the church and the home as moulding forces of national character, thereby greatly disturbing the accustomed balance. Secondly, the educational aim has been characterized by intense effort along intellectual and scientific lines, drawing largely from European models, accompanied by unpardonable neglect of sound training in health and character.

Such, briefly, is the existing condition of the chief agencies by which our national character and power are to be developed. Exactly in proportion as they apprehend the true nature and gravity of their task and harmonize their efforts to its accomplishment, will the integrity of our citizenship be established.

THE WEAKNESS OF PUBLIC EDUCATION

Our children of to-day are the citizens of to-morrow. There is no possible way of producing good men and women except by training children to be such. The good man, the good citizen, is characterized by power of body and mind. Physical training for the body and moral training for the mind must be the foundation upon which all specialized or subsequent training is based.

With rapid movement during recent years, the public schools have, in large measure, absorbed the functions of the church and the home in the training of youth, and the process is still going on. As the schools accept this greater degree of responsibility, they must be answerable for the results. The results are not encouraging. Public educators have mistaken their chief duty and the people have deceived themselves by unjustified confidence and trust in a weak system. Education is a term of the broadest possible significance; but its commonly accepted meaning has been so narrowed that it almost wholly excludes fundamental training. In practice, the public school system of the country identifies "education" with scholarship and culture. These, of course, are worthy attainments, but valuable only as the accomplishment and finish of the human product, not as its substance. Our universities, colleges and other private institutions of learning may find justification in such aims, but public education, having a deeper and more vital purpose to serve, can take no doubtful

chances with the foundation and walls of the social edifice. Superstructure and ornament must wait upon safety and durability. The praiseworthy results of the system are loudly acclaimed and well known. They are found in college entrance examinations and in percentages of scholarship. But outside of this narrow domain, where the great masses of our people must get their daily labor, even after their compulsory education, the picture is not so bright. Alienists tell us that the percentage of insanity is increasing. Criminologists tell us that our nation stands among the worst in its record of murders and other serious crimes. Social welfare investigators testify to the increase of vice and immorality. Medical men testify to the increasing prevalence of pernicious diseases. The vast majority of criminal offences by hold-up men, gunmen, gangsters and thieves are by youths and young men from 16 to 26 years of age, all of whom have been subject to our educational methods, and not a few are graduates of our high schools. When our country calls upon its manhood for defence and in some districts over 50 per cent of its young men are rejected for physical reasons, something is wrong.

Failing in our schools to establish the moral qualities as supreme, discipline itself has become weakened, and we are not only accustomed to sporadic rebellion in classrooms, where the sweet influence of woman is relied upon to persuade young bullies to do right, but we witness the wholesale "strikes" on the part of children to force the hands of authority. The first duty of every nation is to train its children, and these children *have not been trained*, however much they may have been "educated."

What other results can be expected when our public educational experts clasp hands with the faculties of our private institutions and join in the one common aim for scholarship? Success of individual teachers, success of principals and schools, success of municipal school superintendents, and, in the ultimate, success of the entire system, is adjudged by the standards and aims of our private institutions. The machinery is geared primarily to the process of making scholars, and citizens come out as they may in the by-product, with false socialism, anarchy and other scrap.

What other results can be expected when the advancement of teachers depends upon their pupils' success in scholarship, and the most highly rewarded qualification is to be an expert coach for examinations? What else may be expected from a system that

rewards scholarship success of its pupils with honors, while sterling character, unless accompanied by an arbitrarily assigned grade of intellectuality, is contemptuously pronounced a "failure"? What, finally, may we expect from a system whose rank and file have not been subject themselves to direct moral training, are ignorant of its methods, and are not required to present it as a part of their professional equipment?

In the training of youth to whatever specific or general end, no greater mistake can be made than that of permitting intellectual brilliancy and culture to blind us to the supreme value of character. Such is precisely the mistake that pervades the administration of public education throughout our country to-day, and its effects in our large cities have already become a menace. The weakest section in the whole fabric of our government at this hour is the lack of good training of the children.

The attitude of our educational authorities, if not positively unfriendly, is one of indifference to the appeal. Some assert that the home, not the school, is responsible. Others believe that to seriously undertake training would necessitate curtailment of book lessons. Still others maintain that there is no direct way to build character; that it is acquired only by indirect processes, such as good literature, good example, good associations, etc. A few uphold the fatalistic theory, that some individuals "catch it" as they do the measles, while others are impervious.

In conjunction with these conditions there has been a too ready disposition to accept novel and radical educational schemes whose chief claim to recognition is the rejection of time tested foundations. It is openly advocated that children should not suffer direction or control except as measures of extreme necessity, and should be left to discover for themselves the disciplined pathways of life that it has taken centuries to disclose. Some go so far as to deny that obedience is a virtue and decry it as the mark of servitude.

It is a safe statement that never before in the history of the world has the cult of intellectualism so dominated the education of youth as it does at the present time. Pure intellectualism at the best is still the half brother of materialism; and when they are permitted to join forces as the controlling elements of civilization, while physical and moral manhood are neglected, we should cease

to wonder at the difficulties of government and the violent outbreaks that disrupt society.

Such doctrines and practice are but timid yielding to "the easy way" in a situation where courage and confidence are needed. Disappointment, discontent, disorder and anarchy follow in swift sequence. If the citizenship of the country is not trained to loyalty, duty and obedience, government dissolves into social chaos, until restoration comes by a man on horseback. The heroic men and women who settled our country in its earlier history were trained to these disciplinary virtues by spiritual-minded parents who could make little claim indeed to scholarly accomplishment, but who knew the profounder lessons of life.

Such conditions and tendencies are by no means unknown to history. Greece had her similar experience and failed to respond to the warnings of Socrates and Plato. From the abundance of authorities upholding the fundamental virtues as of unrivaled importance, a few selections are given, and it is interesting to notice how accurately the language applies to our common sense thinking of to-day.

"There is education and education," as Plato once had occasion to remark. . . . Education in this mean and narrow sense, the Greeks, with Plato, heartily despised. They set more store by the truer type which trains a man in all a man's qualities, setting him in pursuit of the high ideal of perfect citizenship and teaching him to rule and to obey.—Robinson: *The Days of Alkibiades*, p. 29.

Instruction, though it has power to direct and stimulate the generous among the young . . . is as plainly powerless to turn the mass of men to nobility and goodness.—Aristotle. Davidson: *Aristotle*, p. 12.

The "old education" of Athens . . . solved the problem that must be uppermost with every true educator . . . viz., How can strong, wise and good men be produced?—Davidson: *Aristotle*, p. 62.

Every duty which tends to preserve human relations and human society must be assigned a higher place than any that stops short with knowledge and science.—Cicero. Davidson: *Aristotle*, p. 214.

To act considerably is of more moment than to think wisely.—Cicero. *Idem*.

Quintilian believed that in Education, moral influence and environment are even more important than mental stimulus. . . . Material civilization without any accompanying moral discipline has produced the familiar and inevitable result. . . . But moral and political improvement did not keep pace with an immense material and intellectual progress.—Dill: *Roman Society*, pp. 149, 369, 372.

PHYSICAL TRAINING

The importance of physical training is gaining recognition throughout the country, and the development will undoubtedly be stimulated by the war training our people are receiving. The poor physical showing made by the draft call should awaken our authorities to its urgent need.

We can hardly hope for systematic effort in the homes at present. But as children profit by physical training themselves, and in turn become parents, it is reasonable to believe that they will have more than passive solicitude for the health of their children and will be actively efficient in maintaining a healthy environment for the home. Moreover, they will be more interested and aggressive regarding building and sanitary legislation.

It is in our educational institutions where we will naturally look for the greatest improvement. Physical training was late in getting a foot-hold in our schools, where it is admitted to a small place in the program and receives a sort of stepchild's welcome. It is unfortunate that our public schools seem unable to pursue independent aims of their own, but must follow in flattering imitation the methods of the private colleges. Consequently, in athletics they must have their spectacular contests with picked teams. This leads to a concentration of interest on the part of a few, who often over-train and over-strain, and to the lack of good wholesome recreation on the part of the multitude. Pandemonium under the leadership of an emotional buffoon is no compensation.

The entire student body of the country should be under vigorous systematic training. Intercollegiate and interscholastic contests are desirable and no doubt there will always be specially prepared teams. A variation of the present method might prove of interest. When a match between two institutions is proposed, permit each institution to select out from its entire corps 20 per cent of its number. This would withdraw the crippled, the weak, and the general ineligible. Let the contestants be then drawn by lot from the remaining 80 per cent. The teams made up in this way would be fairly representative of the general athletic condition and skill of their respective institutions. This method would furnish inducement for all to keep in training, and the result would be a better test of the comparative methods of the institutions than as at present.

It is freely acknowledged that it is easier to recognize faults than to find remedies; but the following suggestions are offered:

Up to 18 years of age there should be two periods per day of drill, exercise or play. This should be in the open air. A crowded gymnasium with poor ventilation is injurious.

In our public schools the periodical reports to parents should include the weight, height and chest expansion of each pupil. This would carry to the home live interest in the development of the children, and it also furnishes quick indication of constitutional illness.

Vocal training is a powerful factor in the promotion of health. Lungs, throat, and nasal passages are stimulated and made disease resisting. Posture is improved and deep breathing established. If the time now devoted to elocution, reading aloud and singing could be doubled, the advantages would far outweigh whatever seeming sacrifice it might involve.

Fresh air, sunshine, wholesome food and sound sleep are nature's immediate agents in the development of the young. It is natural and necessary for children to be physically active; it is unnatural and harmful that they keep seated in constrained posture for long periods. Physical activity until the body is thoroughly fatigued is the best inducer of sleep, and it matters little whether this takes the form of work, play, or varied exercises if it is not carried to the point of exhaustion. To seek the bed early because of bodily fatigue, with the mind undisturbed, is far more rational than the practice of school routines that keeps the body comparatively idle during the best hours of the day, while the brain is kept at high tension. If the body is yet physically energized while the mind is fagged, sleep at the best is unsatisfactory and nervous reactions are inevitable. The mind is "younger" than the body, in the sense that its development is later and slower. If, then, it is criminal to over-work children physically, it is fiendish to over-work them mentally. If the ancients ever fell into this error, the records are missing.

MORAL TRAINING

The expression "moral training" falls easily from the lips and flows smoothly from the pens of educators and uplifters. As indicating a purpose and a desirable result, its meaning is quite clear; but as descriptive of the process and means by which the

aim is to be reached, there is much evidence to believe that it carries diverse meanings and that its practice, as complementary to physical training, is almost a lost art.

The vagueness that attaches to the term may be charged partly at least to the word "moral" itself. In the minds of too many people moral training signifies instruction in a code of ethics, to be learned as one would learn a book lesson or memorize a set of adages and precepts, after which it is hoped that the appeal has been so convincing that the learner will make them the guide of his life. Either of the terms "character" training or "conduct" training would be less liable to this misconception. *Moral training* is such *training* as will develop good habits and good character and good social conduct in an individual. It is effective at all stages of life, but its influence is greatest during the years of adolescence. Conspicuous among the desired results are certain recognized virtues whose origin is beyond historic search and whose value as directive forces in human life is confirmed by each succeeding age. Among these we may mention truthfulness, honesty, obedience, loyalty, honor to parents, deference to age, respect for law, sense of duty, self-control, courage, patience and endurance. The possession or lack of such virtues in an individual is recognized by his open conduct. It is true that we cannot look into the hearts of men and discover motive and hypocrisy; but it is equally true that it is usually unjust to the subject and harmful to ourselves when we attempt to do so. In the long run, conduct is the expression of character and it is the most reliable of all tests. Character has direct relation to our habitual *actions*, to what we *do*. It may have but very little relation to our consciousness of what we *ought to do*. Conversely, it is known that character is largely the result of habit. Actions repeated merely as drill, or from any outside stimulus, impress mental patterns that operate involuntarily when the stimulus is suggested. The old saying that thoughts lead to deeds, deeds repeated make habits, and habits make character, asserts the same truth. But deeds, habits and actions of all kinds constitute *conduct*. Thus we find conduct and character complementary and mutually re-active upon each other. They are as closely unified as are the respective totalities of mind and body of which they are, in fact, but phases. Thus we may regard character as a state of mind, and conduct as the physical manifestation of this state. Or,

conduct may be conceived as a course of action, and character as the resulting impress on the mind.

This brings us to the point where we can see that *moral training* or *character training* is essentially a matter inseparable from *conduct*. The time-honored principle, "we learn by doing," has here its full application. There is nothing of mystery or of difficulty in the practice of moral training, and it is far more effective when applied to groups than to individuals. *Good habits are established and character is moulded by regulation and supervision of conduct.*

This is precisely the method used in all good military organizations, and its effectiveness in making over undisciplined, raw adults into worthy loyal citizens, filling positions of trust afloat and ashore, is convincingly shown by our naval records. The younger the recruit the more certain the benefit. The practice of obedience to rules and regulations, established for no other purpose than the common good of all, soon begets the habit of asking the questions, relative to any contemplated action, "Is it right or wrong?" "To do or not to do?" A mind habitually sensitive to these questions is under moral training. It is very doubtful if the graduates of our National Academies fully appreciate the value of the "Conduct Record" as the very foundation of their training. We may at times have felt the sting of injustice—for human devices are imperfect—but if there is any justification for the belief that no body of men have held the standard of honor and duty higher than ourselves, it is due to the training based on the democratic publicity of the conduct record, reinforced and vitalized in us by the example and precept of our worthy superiors.

Preliminary to a just appreciation of moral training is the necessity of comprehending the full and beneficent meaning of the word *obedience*. Unless this is done, the best instruction and practice may fail of response and even opposition may be engendered.

There is a very narrow conception of this word as it is applied to the relations between a cruel tyrant and his subject, a harsh master and his slave, or a severe parent and his child. In such cases we recognize a kind of obedience compelled by force. It is the obedience of subjection. Servitude would be a better term. Its results in extreme cases are degrading alike to both the parties affected. Even where the relations are more liberal, the word carries an unpleasant suggestion from the necessary punishments connected with disobedience.

On the other hand, obedience from the earliest times has been regarded as a basic virtue, and ethical writers and philosophers proclaim it as indispensable to human happiness and a moral or religious obligation among men. Church and state authorities are urgent that parents establish it as a habit in their children. It is the characteristic virtue of the soldier.

We do not have to look far for the reasons upon which such faith is founded. In the world of nature about us matter of all kinds yields obedience to gravitation. Because of this there is majestic harmony in the great sun systems of the universe, and we walk, operate and build on the surface of the earth with confidence and safety. No less true and beneficent is the obedience of atoms to the laws of chemical affinity. Conceive for the moment that all this uniformity is the result of an assumed volition and the disastrous consequences of disobedience are obvious. Thus in the material world we may think of obedience as the solvent that reduces chaos to order. In human affairs where mind is involved and volition is exercised, the conditions are analogous to those of the illustration. Where there is a law we have either obedience and order or disobedience and anarchy. But we are constantly under the influence of law and cannot escape its operation. As individuals we are subject to such obvious laws as those of gravitation and health. In obedience is safety, in disobedience, injury. In our social relations we find ourselves subject to laws so mysterious and fundamental that we ascribe them to a divine source, and in addition to these are rules unmistakably of our own discovery and application that cover the entire range of human conduct. The experience of the race is an unceasing lesson that in obedience to these laws lies the only path to order and happiness.

That obedience has ever been held in such high esteem may be better understood when we reflect that other eminent virtues and qualities are essentially of its substance. As examples, we may cite loyalty, honor to parents, respect for law, duty and self-control. These have significance only after they have passed from mere mental recognition to find expression in action; and the action that manifests the virtue is none other than obedience to some outward or inward appeal in behalf of right.

Obedience is thus seen to be the voluntary response in all our conduct to do right. It is "playing the game" whether the rules

always please us or not, whether we sometimes suffer or not. In a purely personal matter, right is determined solely by the voices from within; in social matters, others are also involved, and right is usually determined by the voice of experience in written or unwritten law.

There can be no government without obedience. Government implies two complementary parts, law-making and law observance. Whether in a monarchy or a democracy, if observance fails, law-making is futile and government does not exist. The crucial test of the strength of a democracy is simply this: Will 49 persons willingly do what they do not like when they have been outvoted by 51? The test of self-control in the individual is similar: Is he unfailingly obedient when he recognizes the majority voice within him? It may be said here that there is nothing more quickly and thoroughly destructive of character than the habit of doing things, seemingly unimportant, when we are conscious they are wrong. This is disobedience and it knows no degrees. Character is fortified by the opposite course which is obedience, and it never misleads. Therein is the imperative necessity of training children.

The attitude of the public toward the profession of arms reminds one forcibly of the attitude imputed to His Satanic Majesty regarding the order of monkhood. It is wholly a matter of his condition of health. When he is sick or in trouble, he embraces it; but when well, he abjures the whole business. In the piping times of prosperity military life is more or less discredited and false views and impressions are entertained regarding it. Among these errors none perhaps is more prevalent than the belief that obedience, discipline, duty, and other manifestations of the profession are maintained by the arbitrary power of supervision, backed by the right to enforce compliance through fear of punishment. The notion is too absurd to merit notice were it not for its persistence. The day is long past, if in fact it ever existed, when any body of men would submit to such conditions. A very little experience in the training of men develops the fundamental principle that the end sought is attained through encouragement, through appreciation of right endeavor, through rewarding the meritorious, and by organizing the best means to secure the greatest physical comfort and justice for all. There is no other possible way to secure obedience and loyalty in military life, or elsewhere. With few exceptions, men respond willingly to such treatment, as they

quickly realize the advantages of system, order and quick response to duty. If there is any better way to arrange the details of life and service, they know that the officers are as desirous of having it as they themselves, and are ready to adopt any reasonable suggestion. The habit of practicing these virtues brings its immediate reward in the common good enjoyed by all.

The youth of our country can be trained to these habits by precisely the same methods. In no way can a high standard of citizenship be more quickly reached than by such definite moral training in our public schools. In our large cities it is an urgent necessity, unless we have already hopelessly abandoned ourselves to an inevitable social deluge.

Children and youth from 12 years of age and upward should be subject to direct moral training for citizenship as the supreme consideration in our public schools. This period would cover what has come to be known as the Junior and Senior High schools. The essential step is to establish the Conduct Record as the chief feature of the pupil's career. The diploma should be a *Citizenship Diploma*, based on this record and reciting the fact that during the period of supervision and training the character of the pupil has been such as to justify the designated degree of merit, and because of this he is recommended to the state as worthy of trust and confidence and giving promise of loyalty in fulfilling the sacred obligations of citizenship. Deny this diploma, absolutely, to any one whose conduct, measured by the scale of merit, falls below the established standard. On every diploma inscribe the scholarship record of the pupil in the various branches, without comment. Any one who fails to receive the diploma should have a certificate of his scholarship record, if he desires it.

This would at once place the emphasis of school life where it belongs; worthy success would be within reach of all who will it; no change is required in the scholarship curriculum and scholarship would be improved by the better conditions and more serious tone of school life. There would be no special "problem" of discipline; all worthy incentives for scholarship excellence still remain, while the incentive for that which is indisputably better than scholarship is supplied. No pupil of good character and faithful effort is denied reward and discouraged for life by being pronounced a "failure" because of weakness in some branch of scholarship. When parents see that obedience, truthfulness, and

good conduct in general are the chief things demanded by the state, and that the diploma depends upon these things, there will be the hearty and effective co-operation by the home, now lacking. When the graduates of such training become parents in their turn, children will have better home training.

Furthermore, this is the only true foundation of military training. It requires no gun and no uniform. If our youth later are to receive the more specialized features of military drill with weapons, as is now advocated, the transition will be easy and the results prompt.

It is an error to regard youth between 12 and 18 years of age as *merely preparing* for life. Preparation for the future is involved, of course; but in a very obvious and real sense they are *actually in life*, cannot evade it, and have responsibilities and duties like their elders. It is their *duty* to be obedient, to respect established authority and to cultivate physical and intellectual industry. They should be held to these duties by the knowledge that failure characterizes them as unworthy, unsatisfactory and undesirable. These are the very penalties they will face later, and the lesson should be learned by the training and experience of the school. Words only, whether of persuasion, chiding or rebuke, are little better than idle breath. Deeds bring the quickest and best results.

It is likewise an error to let children or adults absorb the belief that our public schools are a mere benefaction—a kind of free gift from the plenitude of our resources—for the pleasure or profit of individuals. Such is far from the truth. They are established for the sole purpose of welding our people into loyal, unified effort in behalf of the nation itself. If by their operation we fail to secure loyalty to our institutions, respect for authority and obedience to law, they are unprofitable whatever else may be claimed in their behalf.

If we are to stand firm in the crucial days of the future, then necessity is the all-sufficient justification for this urgent appeal to improve the human element. No need of to-day is greater than that of loyalty and obedience in our citizenship, and this need may be greater still in the near to-morrow. Through neglect to steady our people by the corrective influence of wise training in these virtues, even the supreme benefits of popular government have been reduced to elements of weakness and dissolution.

Liberty is interpreted to mean license, and Freedom has become the privilege to flout law and authority. Minorities are impatient and non-compliant, and the spirit of sacrificial obligation has disappeared.

We need loyal officers for our fleets and ships, we need loyal crews to operate our guns and machinery. Promotion from the ranks will be more common in the future, and in emergencies officers will be made, as we witness to-day, by direct selection from the civilian body. These needs can be met only by a citizenship trained to loyalty and obedience in youth, and one that recognizes the obligation of duty to its government as prior to its demand for rights.

CONTENTMENT BASED ON JUSTICE

Of vital importance to any nation is the cementing of its units into the compactness of a brotherhood that recognizes by its laws and individual conduct the value of common interests above selfish ones. The attainment of this condition will be the realization of loyalty and patriotism, and the pathway is the moral training of the young. To this end we should bend every effort, however ideal may seem the goal. People seek their natural measure of happiness, and they must at least be content. As a body, the people of our country cannot complain because of lack of material things. The supply of food and clothing is ample. But contentment is of the mind no less than of the body. Discontent among the peoples of the world to-day is mental rather than material and results from a mixture of selfish desires, envy and a sense of injustice, oftentimes the result of a vicious propaganda. To the extent that real injustice is involved, it must be removed, for it cannot be cried down the wind. It is not sufficient in any country that justice should be confined to horizontal planes in the various strata of society. It must find expression vertically as well as horizontally and take fair measure of all the services that are interchanged between high and low. Discontent of a people often causes its government to seek relief from internal pressure by expansion against its competitors. The flame started by the Serbian match would probably have been already extinguished if the great nations of Europe had not been heated to the point of easy inflammability by a discontented and aggressive proletariat.

A nation, if it chooses, may permit its people for awhile to live the individualistic grab-bag life, each getting according to his physical and intellectual powers, not only what he can from natural supplies and resources, but from his neighbor as well, and converting the proceeds into a saturnalia of pleasure. But it cannot do these things as the expression of its normal life and then, suddenly, in the advent of war, live the fraternal, cohesive life of justice and common sacrifice that are the purchase price of victory. It cannot even continue to so live in the absence of all external enemies, for involved in such living are the very seeds of discontent and revolution.

Let us endeavor to compress thought of our subject into more compact area. We seek happiness and peace that come through ultimate victory in a continuous warfare against the destructive forces that encompass our lives. We recognize as the most violent and spectacular of our combats, armed international conflicts. We seek to avert these exactly as we seek to avert and avoid convulsions of nature, epidemics, and all other destructive agencies; but the wisest human devices can as yet give us no sure exemption from their devastation.

Man himself is the supreme factor in this warfare, and in his collective capacity as a nation he must maintain his household in order. Provision for supplies and resources must be so elastic as to embrace extreme needs; necessary communications must be controlled and his armies of workmen, professional men, scientists and teachers must be organized for the highest efficiency in the normal phases of the struggle. If not so organized and ready, no hurried improvisation will be adequate for the greater stress. National weapons must be of the keenest edge and superior power and skill must be developed to wield them.

In the ultimate, national power reduces almost wholly to human power, for by it other powers are controlled. Human power manifests itself as a composite of body and mind, and its development is responsive to good training. Health and character are the important aims in training. Childhood and youth cover the most productive period, but good results are not confined to these ages. Our nation is slack and inefficient in both these departments of training and responsibility for results should be placed upon the public schools. In the important issues of life, character is decisive, while scholarship and culture have but minor parts. Our

public schools, first of all, should be character factories rather than intellectual workshops.

Loyalty is incompatible with discontent. Men will not be denied justice. If discontent is ill-founded, justice disarms it; if it is well-founded, only justice will remove it.

We aim then at fundamental preparedness of material and manhood that fits the nation for its every-day tasks, whatever the day may bring forth, and fits us to be worthy co-laborers with other nations in the broad field of the world's work, doing our part and commanding their respect. On this strong platform we would mobilize our resources and concentrate our power for the sublime battle of national life: a battle that is unavoidable, incessant and, like the battle of life for the individual, must be waged against material and spiritual forces. There is no evil or vice that corrupts the heart of man that is not magnified in the heart of the nation. It is here that true preparedness begins, as has been so clearly stated by Admiral Knight in language that repetition cannot stale: "The preparedness of a nation begins deep down in the individual soul of the individual citizen . . . it is essentially a consecration of self to a cause."

Prepared thus from the ground up for the entire field of conflict, we do not hesitate to accept war when righteousness must be bought for a price.

Such preparedness can be established only by consecrated men of clear vision and profound wisdom. While it is essentially the task of statesmen, the entire citizenship must contribute support and make unselfish sacrifice in its behalf. All are deeply interested, and none more so than those of the two services that constitute the arms of defence. It is they who are always on the scouting line and who respond to the first alarm. It is they who are in the van and first-line trenches when the storm breaks. It is they who make ultimate sacrifice at the call of duty, and whose highest ambition is the spiritual one of being themselves worthy of their noble traditions. They are entitled to the leadership and comradeship of men of the highest grade of physical and moral manhood, and they are entitled, above all, to a justified faith in the endurance and support of the government that sends them forth. Let us heed the tragic lessons of weak and faithless governments that have abandoned their armies to slaughter and starvation in the field, or have consumed them in serving the ambitions of rival leaders in revolutionary strife.



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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE NAVY AND FILIBUSTERING IN THE FIFTIES

By LOUIS N. FEIPEL

FOREWORD

The unsettled political condition of some of the Spanish-American countries has always been regarded by the United States Government with solicitude and regret on their own account, while it has been the source of continual embarrassment in our public and private relations with them. In the midst of the violent revolutions and the wars by which they have been almost continually agitated, their public authorities have been unable to afford due protection to foreigners and to foreign interests within their territories, or even to defend their own soil against individual aggressors, foreign or domestic. The resultant inconveniences and losses, therefore, have devolved in no inconsiderable degree upon the foreign states associated with them in close relations of geographical vicinity or of commercial intercourse.

Such has been, more emphatically, the situation of the United States with respect to Cuba, Mexico and Central America. Notwithstanding, however, the relative remoteness of the European states from America, facts of the same order have not failed to appear conspicuously in their intercourse with Spanish-American republics. Great Britain has repeatedly been constrained to resort to measures of force for the protection of British interests in those countries; and France found it necessary to attack the castle of San Juan de Ulloa, and even to debark troops at Vera Cruz, in order to obtain redress of wrongs done to Frenchmen in Mexico.

In line with this well-defined policy, the American Government has uniformly and steadily resisted all attempts of individuals in the United States to undertake armed aggression, or filibustering, against friendly Spanish-American states. To say that our laws

in this respect have sometimes been violated or successfully evaded, is only to say what is true of all laws in all countries, but not more so in the United States than in any one whatever of the countries of Europe. In short, the laws of the United States prohibiting all foreign military eslistments or expeditions within our territory would seem to have been executed with impartial good faith, and, so far as the nature of things permitted, as well in repression of private persons as of the official agents of other governments, both of Europe and America.

The story of the rise and progress of filibustering in the fifties has been told repeatedly. Mention must be made of Caldwell's "Lopez Expeditions to Cuba," Scroggs's "Filibusters and Financiers," Roche's "Story of the Filibusters" (republished under the title of "By-Ways of War"), Walker's "War in Nicaragua," Wells's "Walker's Expedition to Nicaragua," and Jamison's "With Walker in Nicaragua." One looks in vain, however, in those published annals—or, for that matter, in the published histories of the United States Navy—for any comprehensive account of the important and sensational part played by our naval forces in the suppression of filibustering during the sixth decade of the nineteenth century. And yet it is undeniable that but for the interference of the navy in the events attending those enterprises, the history of the regions affected would have taken a far different course from what it did. For the sailor-diplomat, as one historian has it, is pre-eminently a "shirt-sleeve" diplomat. He is a stranger to the devious and tortuous methods of procedure which so long disfigured international statecraft. Being a fighter by profession, he does not underestimate the importance of a display of concrete force when temporarily filling the peaceful office of a diplomat.¹

For the preparation of an authoritative and intelligent account of the naval operations connected with filibustering, the author has had to have recourse to many original sources, many of them apparently hitherto unutilized by historians. For the general background of the story, however, he gratefully acknowledges his indebtedness to the sources and authorities mentioned above.

¹ Paullin's "Diplomatic Negotiations of American Naval Officers." That work, by the way, does not touch upon any of the events included in the present survey.

I. LOPEZ' FIRST EXPEDITION AGAINST CUBA

Filibustering, at least under that name, was unknown to the people of the United States until 1849. Early in August of that year, information was received at the State Department that an armed expedition, under the leadership of Narciso Lopez,² was about to be fitted out in the United States, with the intention of invading and liberating Cuba, and that certain persons were at that time engaged in enlisting and drilling soldiers at several points on our Atlantic coast, to be employed in this hostile enterprise, in violation of our laws and our conventional obligations. President Taylor, anxious to maintain the honor and peace of the country by the faithful discharge of his duties toward a friendly nation, accordingly directed Secretary of State Clayton to call the attention of the various district attorneys along the seaboard to this apprehended infraction of our laws. At the same time, the President issued the following proclamation:

11th August, 1849.³

BY THE PRESIDENT OF THE UNITED STATES.

A PROCLAMATION.

There is reason to believe that an armed expedition is about to be fitted out in the United States with an intention to invade the Island of Cuba, or some of the provinces of Mexico. The best information which the executive has been able to obtain, points to the Island of Cuba as the object of this expedition. It is the duty of this government to observe the faith of treaties, and to prevent any aggression by our citizens upon the territories of friendly nations. I have, therefore, thought it necessary and proper to issue this proclamation, to warn all citizens of the United States who shall connect themselves with an enterprise so grossly in violation of our laws and treaty obligations, that they will thereby subject themselves to the heavy penalties denounced against them by our Acts of Congress, and will forfeit their claim to the protection of their country. No such persons must expect the interference of this government in any form on their behalf, no matter to what extremities they may be reduced in consequence of their conduct. An enterprise to invade the territories of a friendly nation, set on foot and prosecuted within the limits of the

² Lopez, a native of Venezuela, and an officer in the Spanish service, went to Cuba in 1843. In 1848, a conspiracy was formed in Cienfuegos and Trinidad, with the purpose of throwing off the Spanish yoke, but it was soon discovered and crushed. The principal leader in this movement was Lopez, who succeeded in making his escape to the United States.

³ Senate Exec. Doc. No. 57, 31st Cong., 1st Sess.

United States, is in the highest degree criminal, as tending to endanger the peace and compromise the honor of this nation; and therefore I exhort all good citizens, as they regard our national reputation, as they respect their own laws and the laws of nations, as they value the blessings of peace and the welfare of their country, to discountenance and prevent, by all lawful means, any such enterprise; and I call upon every officer of this government, civil or military, to use all efforts in his power to arrest for trial and punishment every such offender against the laws providing for the performance of our sacred obligations to friendly powers.

Given under my hand, the eleventh day of August, in the year of our Lord one thousand eight hundred and forty-nine, and the seventy-fourth of the independence of the United States.

Z. TAYLOR.

By the President,

J. M. CLAYTON, *Secretary of State*.

Confidential orders had already, on August 9, been issued by the Secretary of the Navy, William Ballard Preston, to Commodore Foxhall A. Parker, commanding the home squadron, then stationed at Pensacola, Florida. These orders read as follows:

NAVY DEPARTMENT, August 9, 1849.⁴

SIR: Though the government has no precise information, yet it has been informed by communication from Brevet Major General Twiggs, "that 600 men raised in New Orleans landed on the 31st ulto. on Round Island, three miles from Pascagoula [Mississippi]; that they are unarmed, and encamped under their commander, Colonel White." General Twiggs was informed by Colonel White "that it was a party of emigrants destined to California." The general further states "that, large as was the body of men, he should have given the subject no consideration but for the popular belief that an expedition is being fitted out in the Southwest and West for the invasion of Cuba, or to revolutionize the Mexican States of the Sierra Madre." "Rumor here," the general remarks, "and in the city of New Orleans, points to this body of 600 men as a portion of the band to be employed, and which is to receive large reinforcements from the Western States." Other information, less authentic, has been furnished, in which it is alleged "that Colonel White is preparing an expedition against Cuba, that on the 28th ulto. he had raised 400 men in New Orleans, that he expected to raise in that city in all 800, and corresponding numbers in Boston, New York, and Baltimore, that the recruits at New Orleans are to be drilled at Cat Island, from which point they are to embark in the steamer *Fanny*, about the 20th or 25th instant, for the south side of Cuba, and that a considerable number of the military in Cuba are said to be in communication with them." "Colonel Briscoe, of New Orleans, and Charles C. Campbell are to be officers in the expedition," "that Whiting & Co., of New Orleans, have \$250,000 to forward the expedition."

⁴ *Ibid*,

Any such invasion of either Cuba or Mexico is a violation of our obligations of neutrality, as we are at peace with both governments.

The United States are bound to respect the rights both of Spain and of Mexico, and "no person is permitted, within the territory or jurisdiction of the United States, to begin or to set on foot or provide or prepare the means for any military expedition or enterprise to be carried on from thence against the territory of any foreign prince or state, or of any colony, district, or people, with which the United States are at peace."

You are therefore directed by the President to repair forthwith, with the force under your command, to the vicinity of Cat Island and the mouth of the Mississippi River, and co-operate with the district attorney of the United States and the collector of the customs at New Orleans, and act in concert with them, availing yourself of all such information and of all such means as they may have at their command, and vigilantly and actively observe the movements and operations of any bands or assemblages of people; for the purpose of ascertaining whether any hostile military expedition or enterprise is begun or set on foot, or any means provided, against the territory or dominions of any prince or state, or any colony, district, or people, with whom the United States are at peace.

Should you discover and ascertain any such attempt, by any portion of our citizens, to invade either Cuba or Mexico, you will employ the force under your command to prevent it.

If you should receive any information, or discover any fact, with regard to said movements, you will not only take prompt measures to arrest it, but you will give early notice to the Department.

Should you, on reaching Cat Island and its vicinity, ascertain that a hostile movement is on foot and has proceeded against the Island of Cuba, you will repair with the force under your command to that island, and use all proper means in your power by [? for] preventing their landing, so as to avert and prevent the violation of our obligations of amity and peace with Spain.

The duty assigned to you may become highly delicate and important. The Department relies upon your prudence, your sagacity, and your discretion for the successful accomplishment of the service to which you are ordered.

Very respectfully, yours, &c.,

WM. BALLARD PRESTON.

COMMODORE FOXHALL A. PARKER,

Commanding U. S. Home Squadron, Pensacola, Fla.

Similar orders were sent to Commander V. M. Randolph, of the sloop-of-war *Albany*, to Commander Charles Lowndes, of the sloop-of-war *Germantown*, to Lieutenant W. W. Hunter, commanding the steamer *Alleghany*, to Lieutenant George M. Totten, commanding the steamer *Water Witch*, and to Lieutenant Eben Farrand, commanding the schooner *Flirt*.

On the 18th of August, the *Albany* proceeded to sea, and arrived shortly afterwards off Pascagoula, Mississippi. There Commander Randolph learned that the force which was being collected on Round Island, 3 miles distant from Pascagoula, was to be embarked in the steamer *Fanny* and other conveyances some time during August, and would then proceed with all despatch to the point of destination—either Tampico, Mexico, or some place on the south side of Cuba—there to unite with the disaffected natives in bringing about a revolution—if in Cuba, adverse to the rights of Spain, and if in the Sierra Madre states, adverse to the rights of the republic of Mexico. In the absence of Commodore Parker, who had sailed north with the greater part of the home squadron before the instructions from Washington had reached him, Commander Randolph considered it his duty, as senior officer afloat in the Gulf of Mexico, to maintain, as far as he had the power, that peace and amity which at the time existed between the government and citizens of the United States and those of the two nations mentioned. According to instructions, therefore, he at once communicated with the collector of customs at New Orleans, Mr. Samuel J. Peters, and conferred with him in relation to the situation.

According to Peters, there were about 550 persons then assembled on Round Island, under the command of Colonel G. W. White, and their numbers were daily increasing by small squads of from 2 to 10 men. They were without arms, and undrilled, and they carefully avoided all acts which would brand them as a military expedition. They appeared to have been carefully selected, and were well dressed, though not in uniform. None of them, except the officers, knew what was their destination. Peters was, therefore, of the opinion (and in this opinion the district attorney concurred) that there was no violation of the laws of the United States against raising and fitting out military expeditions against a foreign country with which we were at peace. But that there was an intention to violate those laws, as well as our treaty obligations with Spain or Mexico, there could be very little doubt. Such an intention, Peters held, could easily be frustrated. It was unlikely that these men would be landed in a foreign country without arms and previous preparation. Therefore they must rely on receiving arms and ammunition at some

point, and probably intended landing and drilling somewhere. One or two armed government steamers could prevent the consummation of these designs; but sailing vessels, it was clear, could not be relied on for this duty. By a strict examination of any steamer or other vessels that might be employed to carry these people to their destination or intermediate place of rendezvous, sufficient evidence could probably be obtained to enable the government to frustrate the object of the contemplated expedition. The collector of the port of Mobile, John J. Walker, also held that the strict letter of the Neutrality Act of April 20, 1818, did not admit any power to detain a vessel clearing from the United States under the circumstances indicated. But at the same time, he held, that inasmuch as it was designed to prevent the violation of treaty obligations, and as he was satisfied that the object of this expedition was unlawful, a constructive power might be derived from the act to justify him in refusing a clearance to the vessel.

It was impossible for the *Albany* to approach nearer than 8 miles to Round Island with safety. This was regretted exceedingly by Commander Randolph, as he believed that the scaling of his guns and the explosion of a few shells from the *Paixhans* in view of the encampment of the expedition, would immediately send the men back to their homes, and thus break up the enterprise. As it was, he wrote to Captain John T. Newton, commandant of the navy yard at Pensacola, requesting him to despatch the steamers *Walker* and *General Taylor* to join the *Albany* off the southeast end of Horn Island. With these two steamers, and the *Water Witch*, which had already arrived, Randolph believed he could disperse the band of adventurers, who had now (August 23) congregated on Round Island to the number of 800. His plan was to give the *Fanny* and other conveyances a thorough search on their arrival, and in case he should find arms or other munitions of war on board, he would deem it his duty to detain them and prevent the embarkation of the men, which would, in all probability, defeat the enterprise at once.

While the *Albany* kept her position off the east end of Horn Island, the *Water Witch* was stationed close to Round Island. The boats of the *Albany* assisted in guarding the spot night and day, so as to prevent arms and ammunition from being landed on the island, and also to prevent the adventurers from being

taken from the island in sea-going vessels. On the 28th, Randolph sent a written summons to the adventurers to disperse immediately. This summons read as follows:

TO THE PERSONS ENCAMPED ON ROUND ISLAND, NEAR PASCAGOULA.⁵

Friends and Fellow Countrymen:

The proclamation of the President of the United States, and other instructions which I have received from the government at Washington, make it imperative and proper that I should immediately take measures to break up your unlawful assemblage, and send you back to your homes; and when I have said a few words to you in proof of your assemblage being unlawful, and of the utter impossibility of your evading the vigilance of our squadron and getting out of our waters to proceed upon your contemplated wild expedition to make war against nations at peace with our own, I feel sure you will at once disperse, and seek honest and peaceful occupations.

First. The very *mystery* which marks the movements and actions of your officers, and the blind ignorance of the men as to the destination of the enterprise, clearly show that the objects and purposes of those at the head of your affairs are known to be *unlawful*, and that plunder is the inducement held out to all who embark in this reckless expedition.

Second. We have proof that some of you have acknowledged that your destination was Cuba; and that others of your number have said that the expedition was fitting out for the invasion of the Sierra Madre States of Mexico; showing conclusively that your enterprise is one of a military character.

And lastly. You are *vagrants* in the eyes of the law, and in fact; and therefore cannot be allowed to occupy your present position, and must immediately disperse.

I will now prove to you that we have the means of not only preventing your embarkation to foreign parts, but that we can force you to abandon your present headquarters.

I shall employ all the vessels now in this vicinity, or which may hereafter arrive, in such manner as will most effectually bring about the ends desired.

First. I shall certainly prevent the steamers *Fanny*, *Maria Burt*, or any other steamer or steamers, vessel or vessels of whatever description, from furnishing the adventurers on Round Island with arms or other munitions of war.

Second. If said steamers or vessels have arms or other munitions of war on board, I shall take possession of said arms, etc., and detain said steamers or vessels until the men congregated on Round Island are dispersed.

Third. I shall prevent the band of men on Round Island from embarking on board of said steamers or vessels, or from having any communication with them at all.

⁵ Senate Exec. Doc. No. 57, 31st Cong., 1st Sess.

Fourth. I will make said steamers or vessels anchor within range of our guns.

Fifth. After to-day (28th August), in accordance with a notice before given them, I shall cut off all supplies of provisions which may be intended for the persons on Round Island, and shall rigidly enforce this blockade or embargo until they abandon the spot and go home.

Sixth. I shall gladly give the persons on Round Island every facility to get away; taking particular care, however, that they do not embark in sea-going vessels.

V. M. RANDOLPH,
Commanding U. S. Ship *Albany*, and Senior
Officer Afloat in the Gulf of Mexico.

U. S. Ship *Albany*, off Pascagoula,
August 28, 1849.

But in Randolph's report, made the same day to Captain Newton at Pensacola, he spoke with considerable less assurance regarding his ability to disperse the expedition. He wrote:

I beg leave to reiterate my earnest request to have the *General Taylor*, and *Walker* too, if possible, despatched to this place. Should the *Fanny* and *Maria Burt* make their appearance off Round Island, I cannot answer for the consequences. Our present force is too small to keep the men on the island from being received on board, particularly should the two steamers come provided with arms, which is expected. Even the *General Taylor* alone would be of great service to us. Should you deem it impracticable to fit out the *Walker* for this service, could you not feel justified in chartering the *Creole* for a week or two, and sending her to us with two or more guns mounted from the navy yard, and to be manned and officered from the crew of this ship? I make this suggestion with all deference to your more mature judgment. Two or three field pieces and plenty of ammunition on board the *Creole* would make her an efficient vessel here. Sail vessels are of little use. We want a fast steamer or two, to give chase, should the *Fanny* and *Maria Burt* show themselves.⁶

Captain Newton accordingly despatched the *General Taylor*, under the command of John Pearson, master. Pearson was well acquainted with all the islands and shoals in the vicinity of Round Island, and could be of great service in piloting through the intricate passages. The *General Taylor* had a six-pounder field-piece mounted, with the proper ammunition, etc., as well as small arms for the crew. At the same time, Captain Newton expressed to Commander Randolph his doubts regarding the propriety of interfering to stop the adventurers, in case they were found to have passports, and had taken their passages on board of any vessel

Ibid.

or vessels properly and regularly cleared out of our custom house, and with papers all correct, according to law. Newton also thought that Randolph had transcended his powers in issuing the summons to the Round Islanders. "It is a high prerogative, peculiar only to the President of the United States, Governors of States, and to Commanders-in-Chief of Squadrons when on *foreign service only*."

The *General Taylor*, as also the schooner *Flirt*, arrived off Horn Island on the morning of the 29th, and the *Flirt* was at once despatched to join the *Water Witch* at Round Island. Randolph had, in the meantime, sent a copy of the summons to Collector Peters, at New Orleans, with the request that it be circulated in the city and up the Mississippi River. This request the collector declined to comply with, as he did not consider that the circumstances of the case sanctioned its issue. On the contrary, he entirely disapproved of it as being uncalled for and improper, adding that he and the district attorney were without any substantial and reliable proof which would sanction coercive action on the part of the government. The stringent measures of Commander Randolph were likewise denounced by the newspapers of New Orleans and Mobile.

By September 1, conditions appeared to Commander Randolph to be getting worse. His reports to the Navy Department contain passages like the following:

The more I see of this band of reckless men, the stronger is my conviction that they are ready for any expedition which may be started, and that they are pledged to go wherever their leaders may direct. It is my deliberate opinion that if a *piratical* enterprise were, or could be, projected at this point to rob upon the high seas, that more than one-half of the 450 now assembled on Round Island would instantly volunteer to take part in it. They are a terror to this neighborhood, and I have been assured by a number of the citizens of Pascagoula that they have strong fears for the safety of their lives and property, particularly as our troops have been removed from this vicinity. The civil authorities are afraid to act, and in one instance have been defied.

I have expected, and therefore am not surprised, to hear my stringent measures denounced by the newspapers of New Orleans and Mobile generally, and myself held up to derision, but this I do not regard, as I have seen for a length of time that the majority of newspapers of the two cities above named have been *strangely* silent on the subject of the *movement* which has been agitating these waters for the last six weeks. The irresistible inference to my mind is that the newspapers of New Orleans and Mobile have been paid to keep *silence*. And the same influences have caused them to ridicule and abuse the navy for using prompt and rigorous

measures to put down the lawless enterprise which *they* have studiously concealed from the people. The newspapers of New Orleans and Mobile were the last in the country to allude to the preparations which have been going on, for the last six weeks, to fit out an expedition against either Cuba, Mexico, or Yucatan; and even now they *feign* to make light of it—hence I care but little what they say of me: all that I am solicitous about is that the government will approve of what I have done. . . .

There was a fight on the island last night, and two of the band were so badly stabbed that their lives are despaired of.⁷ These are wretched doings, sir, in our waters, on an island only four miles from a fashionable watering-place, and where there are justices of the peace, a sheriff, and, not very far off, a circuit judge, all afraid to act! I sent the murderer on shore to be dealt with by the civil authorities of the sovereign "State of Mississippi," but could find no one willing to act. Either the people here (including the civil authorities) are sympathizers in the movement, or else are *afraid* to interfere.⁸

Nevertheless, on September 1, the expedition began to show signs of breaking up. On that day, one of the boats of the *Albany* returned from a trip to Round Island, bringing 12 of the adventurers, who were seafaring men, and who were anxious to ship into the naval service. They were good-looking men, and Randolph believed them to be Americans. He therefore determined to let them sign the articles.⁹ Furthermore; a deputation from the band, in the persons of two of their officers, came to Randolph, and pledged themselves that they would accept transportation to New Orleans on the following day, provided Colonel White failed to send a steamboat before that time, and provided also that Randolph would feed them from his vessels in the meantime. To these terms Randolph readily agreed, and instructed Lieutenant Commander Farrand, of the *Flirt*, to convey on the morrow such of the men as were willing to disperse, either to New Orleans or Mobile, provided the number exceeded 50. When the time came, however, the adventurers declined to leave. It seems that Colonel White had arrived in Pascagoula, from New Orleans, and had prevailed upon them to play false to their agreement. Randolph had a talk with White, from which he gleaned that the adventurers still hoped to get to sea in the *Fanny*. He also learned that there was a plan maturing all over the West and Southwest to revolutionize Cuba.

⁷ One of the men had died soon after being stabbed.

⁸ *Ibid.*

⁹ Eight other Round Islanders subsequently shipped on board the *Flirt* and *Water Witch*.

On September 4, the persons on Round Island renewed their application to Lieutenant Farrand for transportation to New Orleans. They stated that they had intended availing themselves of Randolph's offer the day before, but that they were opposed by many of the officers or persons who had control, and those who wished to go were therefore kept scattered. But during the night a large number of them had taken their blankets and encamped on the beach preparatory to embarking in the morning. Lieutenant Farrand sent his boats on shore and had all who wished to leave the island put on board the *Water Witch*. They numbered about 90 persons. They were despatched to New Orleans in the steamer *General Taylor* on the 5th of September.

On the 10th, the steamer *Alleghany*, Lieutenant W. W. Hunter, commanding, arrived from Pensacola. Lieutenant Hunter was at once sent by Randolph to New Orleans, for the purpose of obtaining more certain information regarding the plans of those who were directing the secret movements at Round Island, and also of endeavoring to ascertain positively if the steamer *Fanny* had been purchased by them and was still designed to take them upon the secret expedition. Hunter was a native of New Orleans, and was expected to bring back important intelligence.

Upon his arrival in New Orleans, Hunter learned from Mr. Peters, the collector of the port, and Mr. Bradford, acting district attorney, that in their opinion the energetic and prompt action of the government, together with the apparent want of funds at the disposition of the leaders, had so paralyzed the entire operations, as speedily to bring about a dispersion of the people assembled at Round Island. The steamer *Fanny* had already been purchased. One-half of the purchase price had been paid, but the leaders were unable to pay the remainder. Collector Peters held the register of the *Fanny*. Peters also declared that he could prove the connection between the parties concerned in the purchase of the *Fanny* and persons in New York implicated in similar illegal acts at that place. It was highly improbable, therefore, that any further effort would be made to send abroad the remnant of the band assembled at Round Island. Yet, in order to guard against the possibility of such an event, it was agreed that Collector Peters should give Randolph timely notice of any measures looking to the despatch of the *Fanny* or any other swift light-draft vessel.

At New York, on September 8, District Attorney J. Prescott Hall caused the *Sea Gull* and *New Orleans* to be detained by the naval forces of the United States, as being vessels engaged in the military expedition against Cuba. Hall called upon Captain Isaac McKeever, commandant of the navy yard at Brooklyn, for a force adequate to make the seizures. McKeever detailed four officers and 50 men for this service. With this force, the marshal of the district proceeded to the quarantine grounds in a steamer, took possession of the *Sea Gull* (a vessel of considerable size, having a propeller as auxiliary to her sails), brought her up to the navy yard, and placed her under the guns of the ship-of-the-line *North Carolina*. He then placed an officer with a small body of marines on board the *New Orleans* (a large sea-going steamer), which was lying at Corlears Hook, and detained her in the harbor. The *Florida*, another suspected vessel, was not seized, as she was in no respect ready for sea, and also because the district attorney thought the seizures already made would be sufficient to accomplish all of the government's purposes. These seizures effectually broke up all the plans of the filibusters. The President highly approved all of these prompt, energetic, and judicious actions.

Meanwhile, events occurring in Cuba itself were such as to induce a feeling of insecurity in the greater part of our countrymen in Havana. Several towns issued revolutionary pronunciamientos, a Spanish regiment had passed over to the pronunciados, and the breaking out of a civil war was imminent. The Spanish Government, at the same time, was despatching troops in all directions, and ordering the militia into active service. Commodore Parker, with the *Raritan* and *Saratoga*, of the home squadron, had touched at Havana about the middle of August, but had departed again before the situation became at all tense. The English consul at Havana deemed it prudent to request the British admiral in those waters to send a squadron to the place immediately; and our own consul, Robert B. Campbell, on August 28, followed this up by requesting Commander Randolph to send as large a force as possible to protect American interests. But the breaking up of the expedition at its sources in New Orleans and New York, as narrated above, obviated the necessity of exposing the officers and seamen of our navy to the diseases then prevailing in Havana.

In his reports to the Navy Department, Commander Randolph was careful to justify his conduct with sound reasoning, and suc-

ceeded thereby in gaining the undivided approval of all his actions by the department. His justification was couched in these words:

I was sent here [to Round Island], as I conceive, to defeat the machinations of a large body of reckless and abandoned adventurers; and after obtaining the opinions of those whose position and intelligence enabled them to know best the character of these people, and what they purposed doing, I determined to break up the expedition and disperse the band before transports should be sent to convey them beyond our reach. I saw, as I thought, but one way of doing this, and that one I have adopted. Had I waited until the *Fanny* arrived in these waters, and had I permitted that fast steamer to have communicated with the four or five hundred desperadoes on Round Island, and allowed her to receive them on board, I should indeed have been most blamable. But I warned Colonel White against bringing the *Fanny* within reach of our vessels, and I am well pleased that no attempt was made to anchor her off the island. When I inform you that we had no vessel in the gulf squadron which would stand the slightest chance of overtaking the steamer *Fanny*, you will not be surprised that I positively forbid her coming to Round Island. But I beg leave to make another statement. When I issued the summons to the people on Round Island, there was only this ship [the *Albany*] and the little steamer *Water Witch* at hand. The *Albany* cannot approach nearer than ten miles to Round Island, so that in fact the *Water Witch* and the *Albany's* boats were all we had to keep off the sea-steamer and to guard the island. The *Water Witch* is exceedingly dull, and rarely ever reaches six knots; and the steamer *Fanny* is a large and swift sea-going steamer, and runs at the rate of *twelve* knots the hour. What possible chance would there be for this ship [the *Albany*], anchored ten miles off, and the little dull *Water Witch* to prevent the *Fanny* from taking the men to sea and going to their place of destination, supposing I had allowed her to approach the island? And how should I have known *where* to give chase? I might have shaped my course for the south of Cuba, and in three days the *Fanny* might have landed the adventurers in Tampico! Or I might have made sail for Tampico, and in five days the *Fanny* might have landed the men on the south side of Cuba, or on the Island of Cozamel, east coast of Yucatan!

I must most respectfully beg leave to repeat—I was sent here, as I conceive, to maintain untarnished the honor of the nation, by using all proper means to keep the Round Islanders from leaving our waters to wage war against powers with whom we are at peace and amity. I *have* protected our country from this disgrace, and I cannot believe that you will blame me for what I have done. I had no other alternative: either their sea-going steamship *Fanny* must have been allowed to anchor off Round Island, and so take the adventurers off to sea, or else she was to be warned to keep away, and the adventurers starved out, and thus made to disperse. I have taken the latter alternative.¹⁰

[TO BE CONTINUED]

¹⁰ Senate Exec. Doc. No. 57, 31st Cong., 1st Sess.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

DIVING AND THE DIVING SCHOOL

By LIEUTENANT COMMANDER E. W. STROTHER, U. S. Navy

There are three books on diving that cover the subject as completely as possible at the present stage of development of diving. These books are: "Diving Manual 1916," "Report on Diving Tests 1915," and a "Report of a committee on Deep Water Diving to the British Admiralty" published in 1907. The purpose of this article is not to try to cover the subject of deep water diving, but to bring to the attention of the service the fact that a diving school has been established at the torpedo station, to outline the work that the diving school is doing, and to touch on the most important parts of diving, which are all more thoroughly treated in the above-mentioned books.

The knowledge of diving, which includes the reasons why deep water diving is dangerous, the precautions which are necessary to take in deep water diving, and the remedy for the bends or caissons disease, has not been taught the commissioned personnel. The better an officer in charge of a diving party realizes the limitations of a diver, and in case of emergency what to do, the better it will be for the diver; fewer accidents will then occur, and more will be accomplished. After four years' experience as a torpedo officer, without any experience or training in diving, it is my belief that every torpedo officer should have at least a month's instruction at the diving school.

On November 1, 1915, by orders from the Navy Department, the diving school was established at the torpedo station with the inspector of ordnance as the inspector of diving. At the same time or shortly after, several gunners and chief gunners mates of diving experience were ordered to the torpedo station for duty in connection with the diving school. At that time the diving equipment for a school at the torpedo station was insufficient and there was no building adequately equipped. The winter months of the first year of the school's existence were therefore spent by the

diving school force in obtaining the diving equipment, remodeling the building which had been turned over to them, installing the equipment and fitting out the diving boats. In August, 1916, the first diving class started with 20 graduates of the seaman gunner class and three ship-fitters. The course of instruction is three months. The instruction given this first class was not as complete as the instruction given to the classes following. The diving school is still in the first stages of existence, and as time goes on the equipment will become more complete and the succeeding classes will receive the benefit of this equipment and of the greater experience of the diving instructors.

During the three months' course the class receives instruction in the diving tank under pressure, in diving in the bay, in manipulating air tools under water and in the smoke helmets. At the end of three months an examination is held on subjects covered during that period. The following are the requirements and qualifications for the different classes of divers.

1. The course of instruction is divided into eight subjects, each assigned a weight as follows:

Aptitude for diving	20
Diving and underwater seamanship.....	15
Diving apparatus	12
Salvage work	12
Underwater repair work.....	12
Diving formulæ	11
Decompression and recompression.....	10
Mine rescue apparatus.....	8

General average 100

2. Aptitude for diving will be understood as the aptness of a man for deep sea diving. Qualifications for first class diver are that he must qualify at the deep sea diving school, be physically apt and be able to stand a pressure without effects of vertigo and to be able to do work at depths of 250 feet or over. As a final mark of aptitude he must have at least 3.7 and a general average of not less than 3.5.

3. Second class divers must qualify at this school and be physically fit and be able to stand pressure up to 110 pounds without the effects of vertigo and to do work in depths up to 250 feet. As a final mark in aptitude he must have at least 3.5 and a general average of not less than 3.1.

4. Third class divers are graduates of the seaman gunners class who have qualified at 60 feet and men of the diving class who fail to qualify as first or second class and are able to do work up to 100 feet.

5. Men who are detailed for a course of instruction fitting them to qualify as diver, first class, should not be over 27 years of age; but once a diver has qualified first class he is to continue as such until he has been adjudged incompetent or has been found physically unfit. At the age of 35 he is to be automatically restricted from performing the duties of diver, first class, unless he is found to be physically qualified to dive over 250 feet, but he may continue as a second class diver, without the reduction of rating; at the age of 40 he is to be restricted to the depth of a diver, third class.

6. Men detailed for a course of instruction who are between the ages of 27 and 37 may qualify as diver first class only when in the opinion of the medical officer they are physically fit; otherwise they may qualify as second or third class divers. Men over 37 years of age may be detailed for a course of instruction to fit them as tenders and to take charge of divers.

7. Divers should requalify at least once every four years. Upon requalifying if a diver is found qualified to pass all the required tests, he may be qualified to a higher class diver. Such qualifying should be done at this school.

The diving school building is divided into two parts:

(1) The instruction and study room.

(2) The diving tank and recompression chamber room.

The first four weeks of the course are spent on inside work, and during this time the men are instructed in mathematics, formulæ for air supply to the divers, and formulæ for efficiencies of pumps; in diving in the diving tank; and in the construction of diving pumps.

The greater part of the remaining time is spent in actual diving in Narragansett Bay, the water varying from 25 feet to 168 feet. One hundred and sixty-eight feet is the greatest depth that can be found in Narragansett Bay. To dive to this depth it is necessary to wait until almost slack water. One diver is sent down at a time, and when that diver has returned to 10 feet from the surface another diver goes down. This deep part of Newport harbor is about 100 yards from Castle Hill Light. At this depth, on a bright day, a man can see from five to six feet around him; on an overcast, foggy day, a man standing alongside the descending

line can just see it. The bottom is better here than at any other part of the harbor in which diving has been done. The descending line weight is 200 pounds and even when the tide is almost slack this weight jumps off the bottom several inches.

The men also work with compressed air tools, cutting out rivets and sections of plating from a boiler sunk at the north end of the island.

The diving tank is a cylindrical steel shell made by the New York yard and tested to 210 pounds pressure. The only entrance is in the top of the tank through an air-tight manhole. Around the circumference of the tank near the bottom there are four glass ports through which a diver can be watched. The air hoses and telephone cables to the divers pass through the side of the tank near its top and are made air-tight. The interior of the tank is lighted. The purpose of the tank is to give the diver practice in controlling his air supply and exhaust valves, teach him how to equalize the pressure in his ears, expose him to pressures to which he will be exposed when diving to great depths, and at the same time have him under observation so that if anything goes wrong it will be immediately known and aid can be given.

Four divers can be put in the tank at once, but owing to the small space it is the habit to put only two in at a time. The pressure is raised in the tank by air applied on top of the water. This air pressure is controlled by a valve outside the tank, but each diver can shut off this pressure at will, since the air pipe passes down from the top of the tank almost to the bottom, then around about three-quarters of its circumference and thence to air outlet above the water level. In the air pipe near the bottom of the tank where it is horizontal and extending about three-quarters around the inside of the tank there are four stop valves, the closing of any one of which shuts off the air. The divers are dressed in the second floor of the diving school building and pass down the ladder through the manhole in the top of the tank. The ladder is hauled out, the trap door closed, and pressure almost immediately raised. As the pressure goes up, each diver stands by one of the stop valves, and if he experiences distress he can immediately shut off the air pressure by closing a stop valve. The sources of air supply, both for the divers and for the air pressure on top of the water, are the standard high pressure air accumulators. The air supply to each diver is entirely separate from the air supply which furnishes pressure to the tank.

The recompression chamber is a cylindrical shell lying in a horizontal position. There is a manhole at one end, and glass ports on the side. The tank is equipped with gauges, and air control valves on the outside and inside of the tank. It is used to recompress any man suffering from caissons disease.

The dangers of diving are:

1. A "squeeze" from a fall.
2. Insufficient air supply.
3. Caissons disease which may result in paralysis and death from too rapid decompression.

In diving in shallow depths up to 50 feet, practically the only danger is from a fall and "squeeze," the squeeze resulting from the fall. For example, if a diver were to fall from the surface of the water to 33 feet, the pressure on his body would be doubled, the air supply couldn't be given him fast enough, his head being in an incompressible helmet and his body being in the compressible suit, his body would be pressed up into his helmet causing instantaneous death. At greater depths a fall is not so dangerous, as the relative increase of pressure is not so great; for instance if a diver fell from 150 to 180 feet the corresponding increase in pressure would be approximately from 66 to 80 pounds or one-fifth increase. To prevent the fall, the diver should go down on his descending line, opening his exhaust valve half-way before entering the water, adjusting his air supply with one hand as he descends, and sliding down the descending line, using his legs and one arm. In this way he can stop his descent. The tenders in the boat also should carefully tend the life line and hose, and hold the diver in case he falls. In supplying air to the diver, the fundamental principle to remember is, that at whatever pressure a diver is under, he requires the same volume of air measured at that pressure; thus,

At 2 atmospheres or 33 feet the air supply must be double.

At 3 atmospheres or 66 feet the air supply must be treble.

At 4 atmospheres or 99 feet the air supply must be quadruple.

At 5 atmospheres or 132 feet the air supply must be quintuple.

AIR REQUIRED

Depth	Cu. ft. per minute
Surface	1.5
5½ fathoms	3.0
11 fathoms	4.5
16½ fathoms	6.0
22 fathoms	7.5

and so on. It has been found that the minimum air supply a man can breathe and work under is 1.5 cu. ft. of air per minute. Thus the fundamental formula of air supply is $S = 1.5 (1 + F .0303)$ where S is the cu. ft. of air required, and F the depth in feet to which the dive is to be made. Because of the limited capacity of hand pumps 72 feet is the maximum depth to which a diver can go when one pump is used and still get the required air supply. However, two or three pumps can be connected to one manifold. According to a report of the British Admiralty, a diver went to a depth of 210 feet, being supplied with air by three pumps. The air supply was ample, but the pumping must have been hard work and required shifts of 18 men; it is believed that the compressed air system in use at the diving school is better. To find the number of revolutions required by a pump to deliver sufficient air to a certain depth, first find the efficiency of the pump, then use the following formula $\frac{100}{E} (F \times .194 - C) =$ R. P. M.

E = efficiency

F = depth of dive in feet

C = constant number of R. P. M.'s required to deliver 1.5 cu. ft. at atmospheric pressure. This constant varies with different pumps and is obtained from the diving manual. The method of finding the efficiency is as follows:

T = Theoretical capacity in cu. in. per rev.

P = Test pressure in lbs. per sq. in. by gauge.

C = Capacity of test tank, air hose and air space in pump connections.

14.7 = Pressure of 1 atmosphere.

R = Theoretical number of revolutions required to test tank to P .

X = Number of revolutions actually required to charge test tank to P .

$$1. \frac{CP}{T} = R.$$

$$100 \frac{R}{X} = \text{per cent efficiency.}$$

When the dive is in excess of 72 feet two or more pumps are used. These pumps are connected to a manifold, from which

there is an outlet for one diver. Suppose three pumps, A , B and C , all of the same mark, are used, having as efficiencies E , $E_{\text{.}}$, and $E_{\text{.}}$, the average efficiency being $\frac{E, E_{\text{.}}, \text{ and } E_{\text{.}}}{3} = E_4$. Then ob-

tain the revolutions for each pump by using the formula $\frac{100}{E_4}$

$(F = \times .194 + C)$.

Another method of getting the R. P. M.'s when the pumps are of different marks is as follows:

$S = 1.5 \times 1728 (1 + F .0303) = \text{cu. in. of air required at the depth of diver} = Y$.

Having found the efficiencies of the pumps at the depth of the diver, the output of air in cu. in. at that depth is known. The sum of each pump's output of air is then obtained = total cu. in. output of air = X .

Then $\frac{Y}{X} = \text{rev. per minute for each pump}$.

In very shallow water two divers can be sent down receiving air from one pump, one diver to each cylinder and thus independent; but where two or more pumps are connected to a manifold never send more than one diver down receiving air from this manifold, since if the depth between the divers varies, the diver at the shallower depth will rob the other diver of his air.

The method of furnishing air to the divers at the torpedo station is the high pressure compressed air system. This consists of storing the air in reservoirs; for the diving school the air is stored in accumulators, for the work afloat, in torpedo air flasks in the diving boat. The advantages of this system over that of pumps, in the opinion of men of long diving experience, are very great. The use of the high pressure compressed air system for deep water diving is called for by the diving manual. This system undoubtedly is the best for all diving. It can be readily used on board a destroyer, the air reservoir being the torpedo air flasks on the deck of the destroyer and the diver going down direct from the destroyer. In the fleet there is the drawback that it will probably be impracticable to use torpedo air flasks in the diving boat.

The two great advantages of the use of high pressure air in diving are:

- (1) A sufficient air supply to the diver or divers at all times.
- (2) The diver controls his own air supply; when he wants more air he simply opens his air supply valves.

With these two major advantages are the minor ones of cooler air, small number of men required to man the diving pumps, and more room in the diving boat.

In using high pressure air for diving, the length of time that the supply will last should be known. The formula for obtaining this time and the problems illustrating are obtained direct from the diving manual.

C = Capacity of one air flask in cu. ft.

A = Atmospheres excess pressure in flask.

D = Number of divers.

E = Number of atmospheres excess pressure to which the dive is made.

Allowing 1 air flask atmosphere for charging testing tank, air hose and helmet to E ; 4.5 cu. ft. to each diver per minute measured at absolute pressure or $E + 1$ atmospheres; and reserve pressure of 220 lbs. per square inch or about 15 atmospheres to remain in the air flask in excess of that in which the divers are working, while on the bottom or E , the calculation of time of air supply is as follows:

$$\text{Time in minutes} = \frac{C(A - (15 + E + 1))}{4.5D(E + 1)}$$

Example: One diver is to descend to 165 feet under water. How long will the air of one 11 cu. ft. air flask, charged to 2250 lbs. per square inch, last him?

$$C = 11$$

$$A = \frac{2250}{14.7} = 153$$

$$E = \frac{165}{33} = 5$$

$$D = 1$$

$$\text{Then } 11 \times \frac{(153 - (15 + 5 + 1))}{4.5 \times 1(5 + 1)} = 53 \text{ minutes.}$$

With larger flasks or more flasks the time may be increased. It is also to be noted that the amount of air furnished the diver is 4.5 cu. ft. per minute, while the amount of air furnished by pumps is based on 1.5 cu. ft. per minute. The reason why 4.5 cu. ft. per minute is determined on is as follows:

.045 = amount of CO² exhaled when doing moderate work.

$$\frac{.045}{\text{Percentage of CO}^2 \text{ desired}} = \text{No. cu. ft. per minute.}$$

It has been found that not more than 3 per cent of an atmosphere of CO² should exist in the air that is to be breathed.

$$\frac{.045}{.03} = 1.5 \text{ cu. ft. (pump) measured at absolute pressure of the diver.}$$

It is better if there is only 1 per cent of CO² in the air.

$$\frac{.045}{.01} = 4.5 \text{ (compressed air) measured at absolute working pressure of the diver.}$$

In employing high pressure compressed air, it is necessary that the diver and his attendants be experienced in its use. If not there is danger of the diver being "blown up" or of bursting the air hose. By "blown up" is meant that so much air is given the diver that his exhaust valve is unable to exhaust the air fast enough, his suit becomes inflated and he rises rapidly to the surface; a dangerous accident when happening from a great depth. It is best to keep about 25 lbs. more pressure in the expansion chamber than the pressure to which the diver is exposed. This 25 lbs. excess pressure is needed for circulation of air. There is also the possibility of bursting the air hose, as the hose is tested out to 500 lbs. pressure only. For every foot the diver goes down, the pressure increases .445 lbs. If a diver were going down to 168 feet, pressure 75 lbs., as soon as the diver starts down I would put 90 lbs. pressure in the expansion chamber. The diver himself would control his air supply by his control valve. In case he should happen to fall, by opening his valve wide the danger from a "squeeze" would be entirely removed as the pressure would bank up his suit to counterbalance the water pressure. If the diver were going down to a depth of two hundred or more, I would put 75 lbs. in the expansion chamber as soon as he started down; when the marks in the air hose showed the diver to be about 130 feet, I would increase the pressure to that desired, *i. e.*, 25 lbs. in excess of the depth of the dive.

The greatest danger a diver incurs in deep water diving is the danger of too rapid decompression. The most comprehensive and detailed information on this subject that I have read is contained in a "Report of a Committee on Deep Water Diving," made

to the British Admiralty and published in 1907. I will merely touch on the principal facts brought out by the experiments carried on by that Committee. The cause of caissons disease is explained as follows: "When a gas is brought into contact with a liquid, the latter takes up the gas in simple solution, until a state of saturation is reached. The blood passing through the lungs is practically in contact with the air breathed, and therefore takes up, when a man or animal is in compressed air, an increased proportion of nitrogen and oxygen in simple solution, in accordance with Dalton's law. The increased proportion of nitrogen taken up by the blood in compressed air passes to the various semi-liquid tissues, which gradually also become saturated, since nitrogen, unlike oxygen, does not disappear by entering into chemical combination." Thus a diver becomes gradually saturated with nitrogen, depending upon the depth, the time at that depth and the amount of exertion while at that depth. Upon desaturation, bubbles of nitrogen form in the tissues and blood, and if the depth of the dive has been great and decompression rapid, the bubbles of nitrogen will form more rapidly than the blood can carry them to the lungs and thus cause a stoppage of the circulation and perhaps an aggravated case of caissons disease which will cause paralysis and possibly death. Here is an account of an aggravated case of caissons disease given in the British Admiralty's report referred to.

"M. D., P. O., 1st class, was employed diving for a torpedo in $24\frac{1}{2}$ fathoms of water at Lamash on November 28. He was a man of exceptionally good physique, not obese, and perfectly healthy. A warrant officer was in charge of the diving party, and owing to the great depth of water, took particular notice of the time. He states the man took 40 minutes to reach the bottom, that he remained there 40 minutes, and took 20 minutes to come up. This latter he did himself slowly and steadily without hurry, the men in the boat only taking in the slack of the rope. He climbed up the ladder on the boat's side himself, and, on the face-plate of the helmet being removed, said he felt all right; he then came into the boat with the ordinary assistance to be undressed. When the helmet was taken off, he answered a number of questions about his work, and gave a most detailed account of the same. He also joked with the other men, who all

say they never saw him, or anyone else, come up in better condition. He felt perfectly well all the time he was in the water, suffered no inconvenience whatever, and only came up because it was so dark in the depth he was in that he could find nothing. He was cheerful and sensible, and had absolutely no symptoms whatever of anything wrong till some 8 or 9 minutes had elapsed from the time of his leaving the water. He then suddenly complained of pain in the stomach, and asked them to be quick and get off his dress, as he wished to get on board. In a second or two after he said, 'Send for the doctor,' and immediately slid down in the boat quite limp and unconscious. Fleet-Surgeon McKinley saw him at once, and found him in a comatose state. His skin cyanosed and his breathing was stertorous, labored, and difficult. His lips were blowing and covered with froth. He was taken out of the dress and carried to the sick bay, but death took place before he got there; viz., about 15 minutes after reaching the surface, and 6-7 from the first symptoms of illness. He had no vomiting, convulsions, or spasm of muscles at any time."

It has been found that if the depth of the dive does not exceed 45 feet, there is little danger from rapid decompression and the period of decompression from depths down to 90 feet is very small.

A diver can be safely brought from a depth having a certain pressure to another depth having a lesser pressure when the ratio of the two absolute pressures is 2.3:1. The example herewith given is taken from the diving manual.

"A diver working at a depth of 165 feet under water, or 5 atmospheres excess pressure, or 6 atmospheres absolute. According to the theory, absolute pressure could be diminished to 2.6 atmospheres; *i. e.*, 6:2.6::2.3:1. As we have the atmosphere exerting 1 atmosphere pressure, the diver can be safely brought up to an excess pressure of 1.6 atmospheres, a depth from the surface of 53 feet, the diver coming quickly from deep, dangerous pressure to a comparatively shallow depth, and with various additional stops, at every 10 feet, to the surface. The time at each stop must be such that the proportion of the relative pressure of the nitrogen in solution in the body and the combined pressure of all the gases in the aveoli (total absolute air pressure) shall never be greater than 2.3:1."

Deep sea diving requires a quick descent, short stay at the high pressure on the bottom, and quick ascent most of the way up,

TABLE I.—DECOMPRESSION
STOPPAGES DURING THE ASCENT OF A DIVER AFTER ORDINARY LIMITS OF
TIME FROM SURFACE.

Depth		Pressure in pounds per square inch	Time from surface to beginning of ascent	Approximate time to first stop	Stoppages in minutes at different depths							Total time for ascent in minutes
Feet	Fath.				60 ft.	50 ft.	40 ft.	30 ft.	20 ft.	10 ft.		
0-36	0-6	0-16	No limit									0-1
36-42	6-7	16-18½	Over 3 hrs.	1						5		6
42-48	7-8	18½-21	Up to 1 hr.									1½
			1 to 3 hrs.	1½						5	6½	
48-54	8-9	21-24	Over 3 hrs.	1½						10		11½
			Up to 1 hr.	2							2	
			½ to 1½ hrs.	2						5	7	
			1½ to 3 hrs.	2					10	12		
54-60	9-10	24-26½	Over 3 hrs.	2						20		22
			Up to 20 min.								2	
			20 to 45 min.	2						5	7	
			½ to 1½ hrs.	2					10	12		
60-66	10-11	26½-29½	1½ to 3 hrs.	2						15		22
			Over 3 hrs.	2					10	20	32	
			Up to 1 hr.	2							5	7
			½ to 1 hr.	2					3	10	15	
66-72	11-12	29½-32	1 to 2 hrs.	2					5	15	22	
			2 to 3 hrs.	2					10	20	32	
			Up to 1 hr.	2						2	14	
			½ to 1 hr.	2					3	5	10	
72-78	12-13	32-34½	½ to 1 hr.	2					5	12	19	
			1 to 2 hrs.	2					10	20	32	
			Up to 20 min.	2						5	7	
			20 to 45 min.	2					5	15	22	
78-84	13-14	34½-37	½ to 1½ hrs.	2					10	20	32	
			Up to 10 min.	2						3	5	
			10 to 20 min.	2					3	5	10	
			20 to 40 min.	2					5	15	22	
84-90	14-15	37-40	40 to 60 min.	2					3	10	15	
			Up to 10 min.	3					3	5	10	
			10 to 20 min.	3					3	5	10	
			20 to 35 min.	2					5	15	22	
90-96	15-16	40-42½	35 to 55 min.	2					3	10	15	
			Up to 15 min.	3					3	5	11	
			15 to 30 min.	3					3	7	10	
			30 to 40 min.	3					5	10	15	
96-108	16-18	42½-48	Up to 15 min.	3					3	5	11	
			15 to 30 min.	3					3	7	10	
			30 to 40 min.	3					5	10	15	
			Up to 15 min.	3					2	3	7	
108-120	18-20	48-53½	15 to 25 min.	3					5	5	10	
			25 to 35 min.	3					5	10	15	
			Up to 15 min.	3					2	5	7	
			15 to 30 min.	3					5	10	15	
120-132	20-22	53½-59	Up to 12 min.	3					3	5	8	
			12 to 25 min.	3					5	10	15	
			Up to 10 min.	3					3	5	8	
			10 to 20 min.	3					5	10	15	
132-144	22-24	59-64½	Up to 10 min.	3					3	5	8	
			10 to 20 min.	3					5	10	15	
			Up to 10 min.	3					3	5	8	
			10 to 20 min.	3					5	10	15	
144-156	24-26	64½-70	Up to 10 min.	3					3	5	8	
			10 to 20 min.	3					5	10	15	
			Up to 10 min.	3					3	5	8	
			10 to 20 min.	3					5	10	15	
156-168	26-28	70-75	Up to 10 min.	3					3	5	8	
			10 to 16 min.	3					5	7	10	
			Up to 9 min.	3					3	5	8	
			9 to 14 min.	3					5	7	10	
168-180	28-30	75-80½	Up to 13 min.	3					5	7	10	
			Up to 13 min.	3					5	7	10	
			Up to 13 min.	3					5	7	10	
			Up to 13 min.	3					5	7	10	
180-192	30-32	80½-86	Up to 12 min.	3					5	7	10	
			Up to 12 min.	3					5	7	10	
			Up to 12 min.	3					5	7	10	
			Up to 12 min.	3					5	7	10	
192-204	32-34	86-91½	Up to 12 min.	3					5	7	10	
			Up to 12 min.	3					5	7	10	
			Up to 12 min.	3					5	7	10	
			Up to 12 min.	3					5	7	10	

TABLE II.—DECOMPRESSION

STOPPAGES DURING THE ASCENT OF A DIVER AFTER DELAY BEYOND THE ORDINARY LIMITS OF TIME FROM SURFACE.

Depth		Pressure in pounds per square inch	Time from surface to beginning of ascent	Approximate time to first stop	Stoppages in minutes at different depths									Total time for ascent in minutes			
Feet	Fath.				80 ft.	70 ft.	60 ft.	50 ft.	40 ft.	30 ft.	20 ft.	10 ft.					
60-66	10-11	26½-29½	Over 3 hrs.	2	.....	.....	.....	.....	.....	.....	10	30	42
66-72	11-12	29½-32	{ 2 to 3 hrs.	2	.....	.....	.....	.....	.....	.....	10	30	42
			{ Over 3 hrs.	2	.....	.....	.....	.....	.....	.....	20	30	52
72-78	12-13	32-34½	{ 1½ to 2½ hrs.	2	.....	.....	.....	.....	.....	.....	20	25	47
			{ Over 2½ hrs.	2	.....	.....	.....	.....	.....	.....	30	30	62
78-84	13-14	34½-37	{ 1½ to 2 hrs.	2	.....	.....	.....	.....	.....	.....	15	30	47
			{ 2 to 3 hrs.	2	.....	.....	.....	.....	.....	5	30	30	67
			{ Over 3 hrs.	2	.....	.....	.....	.....	10	30	35	77	
84-90	14-15	37-40	{ 1 to 1½ hrs.	2	.....	.....	.....	.....	.....	5	15	25	47
			{ 1½ to 2½ hrs.	2	.....	.....	.....	.....	.....	5	30	35	77
			{ Over 2½ hrs.	2	.....	.....	.....	.....	20	35	35	92	
90-96	15-16	40-42½	{ 1 to 1½ hrs.	2	.....	.....	.....	.....	.....	5	15	30	52
			{ 1½ to 2½ hrs.	2	.....	.....	.....	.....	.....	10	30	35	77
			{ Over 2½ hrs.	2	.....	.....	.....	.....	30	35	35	102	
96-108	16-18	42½-48	{ 40 to 50 min.	2	.....	.....	.....	.....	.....	10	15	20	47
			{ 1 to 2 hrs.	2	.....	.....	.....	.....	5	15	25	35	82
			{ Over 2 hrs.	2	.....	.....	.....	.....	15	30	35	40	122
108-120	18-20	48-53½	{ 35 to 60 min.	2	.....	.....	.....	.....	5	10	15	25	57
			{ 1 to 2 hrs.	2	.....	.....	.....	.....	10	20	30	35	97
			{ Over 2 hrs.	2	.....	.....	.....	.....	30	35	35	40	142
			{ 1 to 1½ hrs.	3	.....	.....	.....	.....	5	10	15	20	53
120-132	20-22	53½-59	{ 1 to 1½ hrs.	3	.....	.....	.....	.....	10	20	30	30	98
			{ Over 1½ hrs.	3	.....	.....	.....	.....	15	30	35	40	163
			{ 25 to 45 min.	3	3	5	10	15	25	61			
132-144	22-24	59-64½	{ 1 to 1½ hrs.	3	10	10	20	30	35	108			
			{ Over 1½ hrs.	3	30	30	35	40	40	178			
144-156	24-26	64½-70	{ 20 to 35 min.	3	3	5	10	15	20	56			
			{ 35 to 60 min.	3	7	10	15	30	95				
			{ Over 1 hr.	3	20	25	30	35	40	193			
156-168	26-28	70-75	{ 16 to 30 min.	3	3	5	10	15	20	56			
			{ 1 to 1 hr.	3	10	10	15	30	30	101			
			{ Over 1 hr.	3	5	25	30	35	40	203			
			{ 14 to 20 min.	3	3	3	7	10	15	41			
168-182	28-30	75-80½	{ 20 to 30 min.	3	2	3	10	15	25	60			
			{ 1 to 1 hr.	3	3	7	10	20	30	35	111		
			{ Over 1 hr.	3	15	25	30	35	40	40	218		
			{ 13 to 20 min.	3	3	3	7	15	15	46			
182-194	30-32	80½-86	{ 20 to 30 min.	3	3	3	5	10	15	25	64		
			{ 1 to 1 hr.	3	3	5	10	20	30	35	118		
			{ Over 1 hr.	3	5	20	25	30	35	40	228		
			{ 12 to 20 min.	3	3	3	5	7	10	20	51		
194-206	32-34	86-91½	{ 20 to 30 min.	3	3	3	5	10	20	20	67		
			{ 1 to 1 hr.	3	3	3	5	10	15	20	30	35	124
			{ Over 1 hr.	3	15	20	25	30	30	35	40	40	238

then stage decompression; *i. e.*, a short stay at each of the different depths, as shown in the decompression tables.

The depth to which a diver may go is limited by the fact that oxygen under pressure becomes a poison when breathed. The real danger due to oxygen pressure is at about 10 atmospheres pressure absolute or 297 feet, for appreciable periods. This increases with the depth, and at 15 atmospheres pressure absolute, even the shortest stay would be very dangerous.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

ENGINEERING STUDY DIRECTORY FOR NAVAL
OFFICERS UNDER TRAINING

By LIEUTENANT COMMANDER R. R. SMITH, U. S. Navy

The great expansion which has taken place in the navy since the commencement of the war has resulted in the commissioning of many new officers.

The number of officers received from the naval militia was not sufficient to supply the demand for officers and the department was obliged to look elsewhere for the number required. Officers of the naval reserve who signified their willingness to accept general service, and who were recommended by their commanding officers, have been assigned to duty afloat on practically all classes of vessels. Some of these officers were fortunate enough to be sent to the Naval Academy for a three months' course of instruction, and while there, received the advantages of contact with the naval customs and traditions which play so great a part in the formation of naval character. It is unfortunate that they should not have had more time at the Academy, but the urgency of their need for the service did not permit it. Other classes will receive the same course, but a great number of reserve officers going to various ships have not been and cannot be sent to the Naval Academy.

It cannot be expected that these officers will at once be available to perform duties which, in ordinary times, require several years to learn. Nor can it be expected that they will bring with them the same spirit and morale with which the Naval Academy graduate has been indoctrinated.

It becomes incumbent, therefore, upon those in the regular establishment to take these officers in hand and direct their studies to the more important subjects which they should know. If they are to make rapid progress it is necessary that their studies be

supervised, otherwise the subjects will not be covered to the best advantage; too much time will be put on some subjects, and too little on others.

Some reserve officers have been assigned to engineering duties exclusively. They are in most cases technical graduates. Very few have had marine experience; practically none have had experience with naval machinery.

The following schedule of study was prepared for use on the *Alabama* and applies more accurately to the simpler installations of the older ships than to turbine driven or oil burning ships. These subjects have been included in a general way, but the student who covers the course outlined should be able to seek his own information on the newer installations. A minimum of 10 hours of study a week, in addition to watch standing, has been required, but the weekly reports submitted by the officers under instruction have shown from 20 to 30 hours a week.

The success of the course lies wholly in the actual operation of machinery by the student, and his constant attendance when repairs are underway. One four-hour watch in the evaporator room, starting up, blowing down and shifting combinations, is better than the same time spent on the references, although the study is necessary. The knowledge gained by operating the machinery is retained longer than the information obtained from books. It also clarifies many difficult points.

After several weeks watch standing, the student, under the supervision of the watch officer, is required to take charge of the watch. The latter is always on hand to give advice and take charge if necessary, but he should refrain from giving orders unless absolutely necessary and then only through the student.

The amount of time required to train a new officer to take a watch is dependent upon the officer's ability, education and industry, and the amount of supervision and help which the engineer officer can give him.

It is hoped that the following study directory will be found useful by officers under engineering training and by those charged with their instruction:

ENGINEER COURSE FOR OFFICERS UNDER TRAINING

(1) INSTALLATION, (2) EVOLUTIONS, (3) ROUTINE UPKEEP, (4) STORES AND RECORDS, (5) ELECTRICAL
PART 1.—INSTALLATION

Subject	Reference for study	Operation	Repairs and upkeep
1. Steam and exhaust lines, both main and auxiliary, from boilers to condensers, including valves, traps and fittings on lines. Line sketches.	Ship's blue prints. Naval Machinery—Barton & Stickney. Practical Marine Engines—Durand.	Watch duty. Warming up lines, securing lines, draining lines, cross-connecting lines.	Repacking slip joints. Remaking leaky joints. Repairing leaks. Relagging.
2. Feed lines, main and auxiliary, from condensers to boilers, including valves, fittings, heaters, suction, stowage of feed water and feed pumps. Line sketches.	Ship's blue prints. Naval Machinery—Barton & Stickney. Practical Marine Engines—Durand. Bu. S. E. pamphlet on boilers. Bu. S. E. pamphlet on pumps. Navy Regulations.	Watch duty. Starting and securing a feed pump. Regulating pressure. Operation of feed water heater. Shifting suction. Taking make-up feed. Shifting feed pumps. Operating stops and checks at boiler.	Repacking feed pump. Repairing leak in feed heater. Grinding in checks and stops. Remaking joints.
3. Main engines, principle of construction, steam passages, jacket valves, relief valves, material of parts, pistons, rods and bearings, jacking and reversing engines.	Ship's blue prints. Naval Machinery—Barton & Stickney. Practical Marine Engines—Durand. Bu. S. E. pamphlet "Instructions." U. S. Navy Regulations.	Watch duty. Starting, stopping and reversing. Jacking engines in port. Setting cut-offs. Use of crank pin brasses. Warming up. Securing duties of an oiler. Taking indicator cards.	Cooling a bearing. Overhauling crosshead brasses. Overhauling eccentric gibs and main bearings. Examination of cylinders and valves in port. Repacking throttle.
4. Condensers, main and auxiliary, construction and operation. Circulating and air pumps.	Ship's blue prints. Naval Machinery—Barton & Stickney. Practical Marine Engine—Durand. Bu. S. E. pamphlets "Instructions." U. S. Navy Regulations.	Starting up and securing. Regulation of vacuum. Regulation of circulation water. Stopping of air pump or circulator. (See casualty bill).	Testing. Repairing leaks. Renewing zincs. Renewing air pump valves.
5. Feed tanks and fittings. Location of drains to feed tanks.	Ship's blue prints. Naval Machinery—Barton & Stickney. Practical Marine Engines—Durand. Bu. S. E. pamphlet "Instructions." U. S. Navy Regulations.	Water level. Taking extra feed. Cross connecting. Overflowing. Running back.	Renewal of loofa sponges. Cleaning.
6. Pumps and manifolds. Construction and uses. Connections.	Bu. S. E. pamphlet on Pumps. Ship's blue prints. Naval Boilers—Lyons & Hinds. Practical Marine Engines—Durand.	Starting and stopping. Taking a suction and discharge. Regulation of pressures and check valves. Oiling.	Repacking stems and stuffing boxes. Renewal of disc valves. Setting of valve cut-offs.

ENGINEER COURSE FOR OFFICERS UNDER TRAINING—CONTINUED
PART 1.—INSTALLATION—CONTINUED

Subject	Reference for study	Operation	Repairs and upkeep
7. Boilers, scotch, construction of shell, tubesheets, dry pipe, tubes, furnaces, safety valves, stop valves, water columns and other fittings. Material of each.	Bu. S. E. pamphlet on boilers. Naval Boilers—Lyons & Hinds. Practical Marine Engines—Durand. Ship's blue prints.	Duties of a water tender in detail. Duties of a fireman in detail.	Renewal of grate bars. Replacing broken gauge glasses. Blowing tubes, stopping leaks.
8. Boilers, Babcock & Wilcox, headers, tubes, furnaces, drums, hand plates, baffles, mud boxes, side doors, etc.	Bu. S. E. pamphlet on boilers. Naval Boilers—Lyons & Hinds. Bu. S. E. pamphlet on oil burning. Practical Marine Engines—Durand.	Duties of a water tender in detail. Duties of a fireman in detail.	Not installed.
9. Prevention of corrosion.	Bu. S. E. pamphlet on boilers. Bu. S. E. pamphlet on Water Test. U. S. Navy Regulations. Naval Boilers—Lyons & Hinds.	Testing water daily. Putting compound in the feed water. Using surface and bottom blows. Using of test steel pieces.	See routine upkeep on boilers.
10. Hull drainage—locations and suction of main drains and secondary drains. Pump connections to main drains. Pump and manifold connections to secondary drains. Fittings, line sketches.	Ship's blue prints. Naval Construction.	Taking a suction on a given compartment. Emptying strainers.	Leaks in lines. Renewal of worn valve stems. Leaky flanges.
11. Evaporators, construction, material of parts, principles of operation, pressures, combinations, leaks to tanks. Distillers, feed heaters and feed pumps for evaporator. Line sketches.	Bu. S. E. pamphlet on evaporators. U. S. Navy Regulations. Bu. S. E. pamphlet "Instructions" (re to care of machinery).	Watch on evaporating plant. Starting up, blowing down, testing, water. Prevention of priming. Shifting combinations. Stopping. Shifting bottoms.	Sealing. Renewing zincs. Opening evaporators. Closing up.
12. Flushing system and fire mains.	U. S. Navy Regulations. Naval Construction—Robinson. Ship's blue prints.	Putting pressures on fire mains. Regulation of pressure. Trace leads of both systems.	Regrinding valves, renewing zincs. Renewal of valve stems.
13. Ice machines and ice boxes.	Bu. S. E. pamphlet on Ice Machines. U. S. Navy Regulations.	Watch on ice machines. Oiling, starting, stopping, blowing down, shifting air to ice boxes. Make ice. Loss of pressure.	Repacking of leathers. Grinding of leaky valves. Reseating of valves.

Subject	Reference for study	Operation	Repairs and upkeep
14. Steering engine—differential valve gear, shafting, clutches, wheel ropes. Telemotor control.	Naval Machinery—Barton & Stickney. U. S. Navy Regulations.	Starting, securing, operating from engine.	Setting of limits of valves. Breaks. Oiling, repacking.
15. Ash hoists—follow up gear on valve control.	Naval Machinery—Barton & Stickney. U. S. Navy Regulations.	Hoisting and lowering.	Renewal of cables. Repacking of glands.
16. Winches, cranes, anchor engine, air compressors, principles of same, clutches, etc.	Naval Machinery—Barton & Stickney. U. S. Navy Regulations.	Actual operation of same.	Repacking leads. Repairing breaks.
17. Steam launches—boilers, pumps, engines, feed heaters, condensers and air pumps.	Naval Boilers—Lyons & Hinds. Naval Machinery—Barton & Stickney. U. S. Navy Regulations. Bu. S. E. pamphlet on boilers.	Firing and tending water; starting, stopping and backing of engines. Routine cleaning of fires, tubes and blowing. Preparations for lighting off, hoisting out, banking, handling fires, hoisting in.	Daily inspection. Renewal of grate bars. Renewal of leak tubes. Repacking pipes and fittings. Renewal of engine parts. Refitting of bearings, piston rings, etc. Repairing leak in condenser.
18. Marine Gas Engines—principles of parts and construction. Faults and remedies. Loss of compression, misfires, cooling, fuel supply, firing devices, oiling system.	Internal Combustion Engines (USNR) Bu. S. E. pamphlet on Norfolk Engines.	Priming, starting, running, regulation of spark carbureter, and throttle. Oiling.	Removal of carbon. Renewal of rings. Overhauling bearings, making an air tight gasket. Renewal of oil. Examination of spark plugs, setting commutator. Determining cause of faulty action and remedying same.
19. Machine shop.	.....	A study of capacity and limitations of ship's repair facilities.	
20. Lubrication.	Naval Machinery—Barton & Stickney. Practical Marine Engines—Durand. Lubrication and Lubricating Oils. Lt Comdr. R. R. Smith (paper).	Forced lubrication, wick and hand feed. Kinds of oil—names, properties and uses.	Separating and straining of oil.
21. Turbines.	Naval Turbines—Meyers.	Principles of construction and operation of most prominent types.	Not installed.
22. Oil burning.	Bu. S. E. pamphlet Oil Burning. Practical Marine Engines—Durand.	Lighting off, air pressure, oil pressure; regulation. Principles of oil burning, etc.	Not installed.

ENGINEER COURSE FOR OFFICERS UNDER TRAINING—CONTINUED
PART 2.—EVOLUTIONS

Subject	Reference for study	Operation	Repairs and upkeep
1. Emergency drills—Organization, Fire Collision, Abandon ship, General Quarters, Torpedo defence, Repair Stations.	Ship's organization bills, Ship and Gun Drill—1916, Naval Engines and Machinery—Barton.	A study of the principles of organization. Making up station bills. Duties of the officer of the watch for each drill. Engine-room, fire-room and auxiliary station, dispositions. Reports made. Watch duty.	Revision due to changes. See emergency bill for casualties.
2. Casualty drills—probable derangements and action to be taken.	Ship's casualty bill.	Actual drill at each casualty.	As per bill.
3. The officer of the watch under-way.	U. S. Navy Regulations.	Watch standing.	
4. Getting underway.	U. S. Navy Regulations, Naval Machinery—Barton & Stickney, Practical Marine Engines—Durand.	Watch standing. Actual starting of each auxiliary in proper order. Warming up. Lighting up boilers and cutting in, etc.	
5. Securing.	U. S. Navy Regulations, Naval Machinery—Barton & Stickney, Practical Marine Machinery—Durand.	Watch standing. Drying out boilers, draining steam lines, securing stops, and main engines and auxiliaries.	
6. Banking fires and standing by—spreading fires.	U. S. Navy Regulations, Bu. S. E. pamphlet on boilers, Practical Marine Engines—Durand, Naval Machinery—Barton & Stickney.	Watch standing. Burning down, clinkering, and banking of fires. Stops. Pressures under banked fires. Precautions—spreading and cutting in.	
7. The officer of the watch in port.	U. S. Navy Regulations, U. S. Atlantic Fleet Regulations, Naval Machinery—Barton & Stickney, Ship's Regulations.	Watch standing, Day's duty, Inspection of power boats, overhaul, cleaning, routine, reports made.	
8. Coaling ship.	U. S. Navy Regulations.	Inspections, tally, estimates, coaling, rigging chutes, etc.	

ENGINEER COURSE FOR OFFICERS UNDER TRAINING—CONTINUED

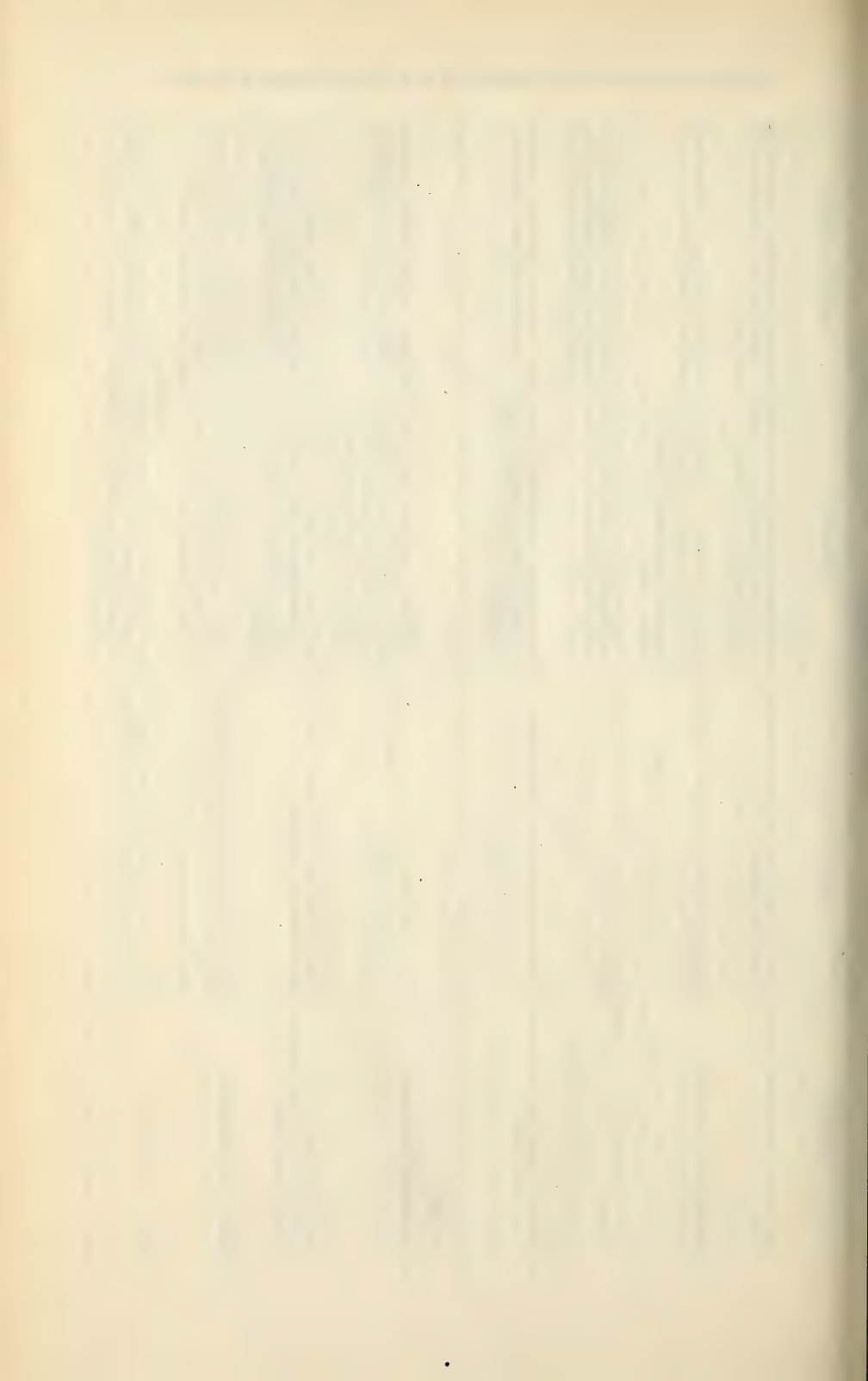
PART 3.—ROUTINE UPKEEP

Subject	Reference for study	Repairs and upkeep
1. Main Engines.	U. S. Navy Regulations. Bu. S. E. pamphlet "Instructions."	Examination of cylinders and valves after runs. Overhaul of bearings. Examination of oil service and cleaning. Examination of water service and repairs. Quarterly examination of holding down bolts.
2. Main engine auxiliaries.	U. S. Navy Regulations. Bu. S. E. pamphlet "Pumps." Bu. S. E. pamphlet "Instructions."	Examination of condensers—semi-annual and when testing over .9 grains chlorine per gallon. Renewal tubes, ferrules and zincs. Testing after repairs. Setting of air pump steam valves. Renewal of packing, valves and valves springs. Circulating engine.
3. Auxiliary condensers, F & B pumps, feed pumps.	U. S. Navy Regulations. Bu. S. E. pamphlet "Instructions." Bu. S. E. pamphlet "Pumps."	Periodical examination of condensers for corrosion, and for leaks when test is over .9 grains chlorine per gallon. Renewal of tubes, ferrules, zincs; air pump valves, springs, etc.; testing after repairs. Repacking of pumps, renewal of rods, valves, springs, etc.
4. Boilers.	U. S. Navy Regulations. Bu. S. E. pamphlet "Boilers." Bu. S. E. pamphlet "Water Test." Naval Boilers—Lyons & Hinds. Practical Marine Engines—Durand.	Boiling out—cleaning—renewal of gaskets. Testing. Overhaul of valves, gauges, stops. Setting of safety valves. Renewal of gauge glasses, grate bars, etc. (Zincs where compound is not used.) Steaming hours allowed.
5. Auxiliary machinery.	U. S. Navy Regulations. Bu. S. E. pamphlet "Instructions."	Periodical examination and reports. Breakage, repairs and renewal of valves, seats, bearings, etc. Laying up for cold weather. Repacking, etc.
6. Coal Bunkers.	U. S. Navy Regulations.	Care and preservation. Ventilation, fire precautions. Lighting. Water tightness. Inspections.
7. Double bottoms. Drainage.	U. S. Navy Regulations. Naval Construction—Robinson.	Care and preservation. Water bottoms for feed. Reserve bottoms. Strainers. Sluice gates. Overhaul required. Paints used.
8. Docking.	U. S. Navy Regulations.	Examination of outboard valves and strainers. Renewal of zincs. Examination of propellers, shafting, struts, zincs.
9. Navy Yard Repairs.	U. S. Navy Regulations.	Inspection of progress and methods. Ship's work in connection with same.

ENGINEER COURSE FOR OFFICERS UNDER TRAINING—CONTINUED
PART 4.—STORES AND RECORDS

Subject	Reference for study	Procedure
1. The Log.	U. S. Navy Regulations.	The rough log. Coal reports from firerooms. Water consumption form. Rough reports from ice machines, and evaporators. Oil reports from storerooms keeper. The smooth log, embodying all of the above data sheets signed by the watch officer, engineer officer and submitted to the commanding officer daily.
2. Coal Reports.	U. S. Navy Regulations. Engineering Competitions.	Double entry tally sheets for each bunker kept daily. Checking by estimate daily and before and after coaling. Expending overs and unders. Noon report of coal used and on hand to captain.
3. Daily reports from all stations on improvised forms. Ice machines, Evaporators, Lubricating oil. Fresh water used, both for ship's tanks and for make-up feed. Water tests.	U. S. Navy Regulations.	Reports to show data for information of engineer officer as follows:—Hours of operation, temperatures, pressures, amounts received and expended, sources and outlets. Alkalinity and salinity of all water units.
4. Repairs and machinery record.	U. S. Navy Regulations. Confidential Bulletin of Engineering Information No. 33, of May 11, 1916. U. S. Atlantic Fleet Regulations.	Daily progress of repairs logged by index number. Individual card for each unit, showing daily progress, when occurring. A weekly list showing progress of repairs for ship's use, including navy yard, repair ship, and ship's force job orders.
5. Quarterly & monthly reports.	U. S. Navy Regulations. U. S. Atlantic Fleet Regulations.	Special reports on condition of machinery under cognizance of other bureaus. Fuel report. Log submitted quarterly with machinery index and comment of engineer officer on condition of machinery. Boiler record sheets. Reports of changes in power boat machinery.
6. Navy Yard Repairs and Alterations. Repair ship repairs.	U. S. Navy Regulations. U. S. Atlantic Fleet Regulations.	A study of the correct procedure and form for initiating repairs. Navy yard job orders. Inspections.
7. Ship's job order system.	S & A form 316. General Order No. 232.	Job orders issued for all work undertaken on board to permit cost accounting.
8. Stores.	Allowance lists. U. S. Navy Regulations. S & A form 307. Ship's forms for cotton waste, soap, lubricating oil, etc.	Title "B" stores and spare parts. Orders on G. S. K. for title "C" or expendable stores, orders for title "D" stores, (repairs to title "A"), orders for title "P", stores, (repairs to title "B"). Minimum amounts of grate bars, lubricating oils, gaskets, etc., to be kept on hand. Stores kept on hand. Duties of the G. S. K. and storeroom keepers. Military importance of conservation of stores. Inventories required. Requisitions and surveys.
9. Steaming competition.	Engineering Competitions—Confidential.	The Engineering Multiple. How made up. Daily records required. Methods of economy. Methods of economy in water, coal and lubricating oil.

Subject	Reference for study	Operation	Repairs and upkeep
1. The dynamo engine and auxiliaries.	Naval Electricians Text Book—Bullard. Ship's blue prints.	Starting and stopping, draining and lubrication. Operation of dynamo condensing plant. Shifting to engine-room condenser.	Repacking. Overhaul of bearings. Renewal of oil. Adjustment of governor.
2. Generator and switchboard.	Naval Electricians Text Book—Bullard. Ship's blue prints.	Cutting in a generator. Cutting out. Running in parallel. Regulation of voltage and distribution of load. Operating switchboard. Watch in dynamo room.	Faults and remedies of dynamos and motors. See Bullard.
3. Circuits—power, light, searchlights.	Naval Electricians Text Book—Bullard. Ship's blue prints.	Cutting in and out. Nomenclature and designation of circuits. Loads used. Circuit breakers and fuses.	Ground tests. Insulation tests. Renewal of fuses. Assignment of circuits to electricians for upkeep, including lights, fans, power units and fixtures.
4. Electrical operating units—motors, searchlights, etc.	Naval Electricians Text Book—Bullard.	The operation of searchlights. Special applications of motors to naval uses. Ship's interior communication system.	Uses. Routine inspections required. Troubles experienced. Remedies.
5. Auxiliary generating units for interior communication and fire control.	Naval Electricians Text Book—Bullard. Ship's blue prints.	Starting, stopping, regulation, switchboard.	Faults and remedies of dynamos and motors. See Bullard.
6. Fire Control Installation.	Ship's blue prints. Confidential pamphlets on standard fire control installation. Target Practice reports.	A study of the plotting room switchboard. Designation of all standard circuits by letters. The fire control telephone—visuals. Buzzer circuits. The plotting room in operation.	Telephone troubles. Circuit troubles. Buzzer troubles. Daily tests. Probable faults and casualties. Target practice.
7. Storage Batteries. Sulphuric acid—lead batteries. The Edison Battery.	Naval Electricians Text Book—Bullard. Manufacturers pamphlets.	Charging and discharging. Renewal or strengthening of electrolyte. Testing. The uses of storage batteries on ship board. Power boats. Gun fire.	Buckling of plates—sulphating—overcharging—over discharging. Overhaul and renewal of plates. Record of tests and charging kept.
8. Radio—The Installation.	Naval Electricians Text Book—Bullard. Manual of Wireless Telegraphy—Robinson. Ship's blue prints.	A study of the installation. Starting up. Adjustments in operation of sending sets and receiving sets. Testing for wave length.	Overhaul of motor generator, antenna, renewal of condenser jars. Tests of circuits for breaks, leakage and radiation losses.
9. Stores and Records.	See part four. The daily rough log. The quarterly report of electrical plant.	Procedure The record of oil used, lamps expended. Repairs undertaken. Keeping of rough electrical log by watches. Records of storage batteries maintained. Requests for material, spare parts and surveys.	



U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE ECONOMICAL EMPLOYMENT OF AUXILIARY EXHAUST STEAM

By LIEUTENANT E. E. WILSON, U. S. Navy

One of the important engineering problems of the day is the attainment of economy by the recovery of waste products through their employment in useful work. In this class comes the recovery of waste heat in the auxiliary exhaust steam—a process which has been well developed in shore practice but more or less neglected by marine engineers. It is the object here to describe one method of recovering this heat which has been entirely successful, with the idea that any features of this particular problem which may be adapted to other installations may be made available.

The fundamental principles involved are as follows :

(1) The total heat available for recovery in the latent heat of the exhaust steam may be four or five times that which is converted into useful work in the auxiliaries themselves.

(2) This heat, which is not available for further work in engines, may be recovered in heat transfer apparatus, such as feed heaters.

(3) Not all the exhaust steam is available for recovery, for the reason that a large part of the machinery depends upon high vacua for its efficiency, and the temperatures corresponding to these vacua are too low to permit the transfer of heat to any useful purpose. Generator turbines and main engines come under this head.

(4) The exhaust of such auxiliaries as pumps and reciprocating units of small sizes is immediately available, however, for the reason that these engines are not capable of utilizing high vacua and are easily operated against a back pressure.

(5) At a back pressure of 15 pounds gage, the temperature of the steam is in the neighborhood of 250 degrees F., and this tem-

perature is such as to permit doing useful heating work, warming some substance that needs warming by *condensing* the steam.

(6) If all the exhaust steam can be condensed in the process there is no need of the auxiliary condenser, and the steam for this auxiliary may be saved.

(7) If at the same time the auxiliary exhaust steam is utilized to do heating formerly required of live steam, then the economy becomes very important. In the particular installation to be outlined, the saving was of the order of 25 per cent of the average daily expenditure in port.

In ordinary marine practice the above principles are employed in the heating of the boiler feed water and sometimes in other warming about the ship. They seldom go further, however, yet the most important economy is possible in the use of the exhaust steam in the evaporators, and it is intended to show here that no special design of low pressure evaporators is needed to attain complete success.

In Figure 1 a sketch has been prepared of the particular arrangement to be described. For the sake of clearness a simple line sketch is utilized and the layout is made in the form of circuits. From the feed tank, water is delivered to the boiler where it is vaporized and sent out to the main steam line. In parallel across the main steam and auxiliary exhaust lines are shown the many auxiliaries whose heat is available for recovery. The pressure on the main line is boiler pressure, while that on the exhaust line is the back pressure, and the corresponding temperatures are noted. This may be called the high-pressure circuit.

From the auxiliary exhaust line to the feed tank the various heat transfer apparatus is shown in parallel, just as the engines were shown in parallel in the high-pressure circuit. In this apparatus, however, the steam is condensed and returned to the feed tank as water, thus completing the whole round. Two exceptions to the above are noted at the right. One of these is the dynamo circuit, which by-passes the auxiliary exhaust line entirely and condenses the steam in its own condenser. The other is the high-pressure drain line which accomplishes the same thing by condensing the steam in the main steam line and trapping it back to the feed tank.

The circuits have been numbered and can now be followed out. Circuit No. 1 is the high-pressure drain circuit mentioned above. Water comes back through it at about the temperature of the

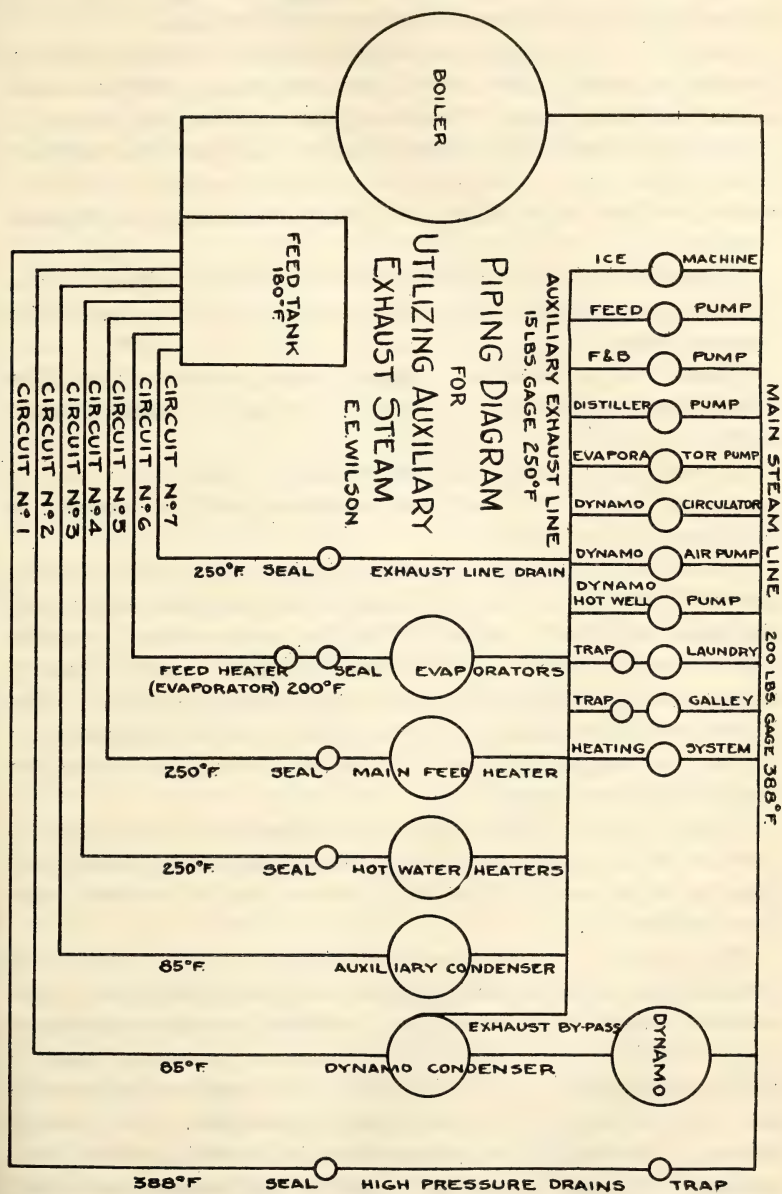


FIG. 1.

steam, say 380 degrees F., and is discharged, through a pot with a water glass attached, into the bottom of the feed tank.

Circuit No. 2 is the dynamo circuit mentioned above containing its own condenser, which delivers the water back to the feed tank at near the temperature of the circulating water, say 85 degrees F. As a sort of shunt in this circuit is shown a lead from the auxiliary exhaust line direct to the dynamo condenser, which permits by-passing exhaust steam back to the feed tank through the dynamo returns.

Circuit No. 3 is the auxiliary condenser circuit, whose returns go to the feed tank at about 85 degrees, as in the case of the dynamo returns.

Circuit No. 4 is the first exhaust steam circuit, and includes heaters, such as bath heaters, warming pans and the heating system itself.

Circuit No. 5 is the feed heater circuit. This steam goes to warm the boiler feed, and after condensation flows through a water seal to the feed tank.

Circuit No. 6 is the evaporator circuit. This steam is condensed in the coils of the evaporators in the process of evaporating the sea water which is to be distilled for ship's service. A water seal is placed between the coil and the feed tank to prevent blowing through, and in addition a heater is installed in the returns. This heater robs the condensate of about 50 degrees of its temperature to heat the evaporator feed, so that the condensate reaches the tank at about 200 degrees.

Circuit No. 7 is a drain in the exhaust line at its lowest point to prevent the accumulation of water in it and avoid breaking the pipe by water ram. It, too, has a water seal to prevent steam blowing through.

The amount of heat transfer apparatus in the layout is so adjusted that under normal conditions the back pressure is maintained at about 15 pounds gage, with the auxiliary condenser stopped. If, for any reason, extra machinery is started and the back pressure goes up, it is handled in the dynamo condenser to the limit of capacity of the small by-pass line. For further increases the auxiliary condenser may be started, and the back pressure regulated accordingly. In the adjustment mentioned above, it was found desirable to keep the laundry and galley, and at times the heating system, on the high-pressure steam because the

exhaust was not warm enough. These places are therefore shown in parallel with the machinery in the high-pressure circuit, though they are really heat transfer apparatus and could be in the low-pressure circuit. Traps are installed on their discharge lines to the exhaust line, and in case these blow through, the steam is not ordinarily wasted as it is promptly condensed in the low-pressure circuit.

In describing the lines, mention was made of the temperatures of the returns. These are quite important, because if they get above 212 degrees in the feed tank this will boil. As a matter of fact, this does not occur, for the reason that the volume of returns from the dynamo condenser at 85 is about equal to those coming back from the evaporators at 200 degrees, and the result is enough to maintain the average feed tank temperature at less than 180 degrees F. Of course, the high-pressure drain line must be kept well trapped and the water seals must be tended by men on watch. However, this is extremely simple.

In the particular plant described there is one most important feature which is not shown in the diagram. This is the method of getting the evaporators to handle a large amount of exhaust and thus deliver sufficient water for daily use. With steam at 15 pounds gage in the evaporators as installed, the shell pressures ran about 8 pounds gage, and only a comparatively small amount of water was distilled. When, however, a small fresh water pump was installed with a suction on the distillers it was found to pull a vacuum of about 15 to 20 inches, giving a pressure on the evaporator shell of 0 pounds gage. With the whole plant running in single effect, the output became sufficient for ship's service with a certain amount of reserve capacity, and it became a simple matter to condense all the exhaust steam in the low-pressure circuit as shown.

As a matter of fact, it was found that under certain conditions of operation there was not enough exhaust to maintain the back pressure at 15 pounds. To overcome this a line was led from the main steam line direct to one of the evaporator coils and a small amount of live steam was thus used for boosting the back pressure. As a result of this arrangement lack of sufficient back pressure need be no excuse for shifting the evaporators to live steam. Instead, by boosting the pressure the exhaust was still rendered available for use and the evaporator output was maintained.

The outline above constitutes a general description of a plant in which a net saving of 25 per cent has been accomplished by recovery of waste heat in the auxiliary exhaust steam. Not only is the large quantity of heat which was wasted in an auxiliary condenser completely recovered, but in addition the energy formerly required to run the condenser and waste the heat is saved. The principles here laid down are available for application in any marine installation, large or small, and for this purpose two outstanding features must be emphasized: (a) If a large amount of exhaust is available for recovery it can be handled by means of an air pump on the distillers. The greater the vacuum pulled the greater the amount of water evaporated, and the greater the quantity of steam condensed in coils. (b) If a small amount of exhaust is available for recovery the back pressure can still be boosted with a little live steam and the waste heat utilized as before. These features permit the adjustment to local conditions and insure success in every case.

In the arrangement described, the water distilled has been absolutely fresh at all times, and the danger of making salt water so characteristic of high-pressure evaporators has been obviated.

The interesting feature of the whole installation is a sort of paradox in seagoing engineering, *i. e.*, it is more economical to distil water than not to do so, for the reason that with the evaporators secured it is necessary to run an auxiliary condenser.

U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

ATTACKS ON UNARMED ENEMY MERCHANT
VESSELS¹

By CHARLES CHENEY HYDE,

Of the Chicago Bar, Professor of International Law in North-
western University Law School

May a belligerent warship lawfully attack at sight an unarmed enemy merchantman? It may occasion surprise that a speaker before the American Society of International Law should venture to raise such an inquiry at such a time. The writer shares, however, what is doubtless the view of all here present, that a belligerent warship normally lacks that right. While such a vessel may lawfully attempt to gain control of or destroy all enemy ships not exempt from capture, the law of nations is vitally concerned with the processes employed. It does not sanction the needless sacrifice of life or property.

It is still worth while to observe how the immunity of the merchantman from attack at sight has developed, and again, what conduct, if any, on the part of such a vessel subjects it to treatment such as may be lawfully accorded a public armed ship. Finally, it is important to consider whether the equities of the merchantman are restricted by reason of the nature and limitations of the fighting craft of the enemy.

Long before the European War, nations were agreed that unarmed enemy merchant vessels were in general not subject to attack at sight, and that if they were guilty of no improper conduct, the propriety of attack or destruction was dependent upon the giving of opportunity for the removal of persons on board to a place of safety. Such respect for human life was, moreover, broadly acknowledged without discrimination between carriers of passengers and freight, and irrespective of the nationality of the persons involved.

¹ Reprinted from the Proceedings of the American Society of International Law at its eleventh annual meeting held at Washington, D. C., April 26-28, 1917.

In days when privateering flourished the unarmed merchantman was a thing unknown. Ships of commerce did not put to sea without substantial armament. This at times sufficed to enable the possessor to offer prolonged resistance and positive danger to any type of vessel encountered. Consequently there was no reason to deal lightly with a vessel itself capable of initiating hostilities, and possibly alert to do so whenever favorable opportunity presented itself. Dictates of humanity could only urge restraint when at least, apart from other considerations, the merchantman ceased to be a source of danger to the naval forces of the enemy. The earliest instructions to American privateers, dated April 3, 1776, authorized the commanders by force of arms to "attack, subdue, and take all ships and other vessels" belonging to the inhabitants of the enemy's country. There was no suggestion that any ships belonging to them should be treated with leniency. As doubtless the entire merchant marine of the enemy was armed, at least defensively, it was logical that the instructions should place all enemy vessels in the same category. The instructions of President Madison to American privateers issued in 1812, stated that "towards enemy vessels and their crews, you are to proceed, in exercising the rights of war, with all the justice and humanity which characterize the nation of which you are members." No discrimination was, however, made in respect to any class of enemy ships, and doubtless none was thought of.

With the abandonment of privateering and the confining of hostilities to public vessels specially adapted for war, the arming of merchantmen became increasingly infrequent because of the helplessness of such vessels in engagements with a warship, which was the only type of craft from which acts of aggression were to be anticipated. The latter, moreover, with its vast preponderance of offensive power and defensive strength, found the merchantman a negligible danger and regarded it rather as an object of prey. Thus the very weakness of the latter became a safeguard, and the unarmed merchantman gained the right to be called upon to surrender before attack.

Although useful to its own state as a carrier of articles needed for the prosecution of war, the enemy merchantman did not lose the right to demand a signal to surrender before being attacked. Respect for humanity still outweighed the claims of military necessity, a fact which neither the writings of publicists nor the naval codes of maritime Powers purported to deny.

At the present time an unarmed enemy merchant vessel, such as a trans-Atlantic liner of great tonnage and high speed, although designed and employed primarily for the transportation of passengers and mail, is still capable of rendering incidentally substantial military service as a carrier of war material. Its speed may enable the vessel to outdistance any pursuer and to keep beyond the range of a signal to stop. Wireless telegraphic equipment may offer means of summoning aid whenever needed. The instant destruction of the ship without warning may thus offer the sole means of preventing its escape and the delivery of contraband articles at their destination. The success of the voyage, despite its principal purpose, may serve to prolong the war by adding to the resources of the state to which the vessel belongs. It is not believed, however, that the indirect harm to be wrought in consequence of escape equals that to be anticipated from the deliberate disregard and destruction of the lives of the occupants of the ship. Claims of military necessity still fail to turn the scales of justice.

The unarmed freighter, not so given over to the transportation of war material as to be deemed primarily an instrument of belligerent service, is believed to be entitled to similar treatment. A total absence of passengers does not deprive officers and crew of safeguards which are fairly due noncombatants. Nor does the smallness in number of the individuals whose lives are at stake weaken the equities of the occupants of the ship, unless it is bent on an essentially hostile mission. The slower speed of the vessel as compared with that of the passenger liner, lessens, moreover, the chances of its escape in case of pursuit.

Doubtless the peculiar occupation or sinister conduct of an unarmed merchantman may so strengthen the equities of an enemy warship as to cause the claims of military necessity to outweigh every other consideration. The cases falling within this category do not, however, weaken the principle that the carrier is normally exempt from attack at sight, or that the enemy vessel which fires upon it without warning assumes the burden of showing that its victim has forfeited the right to exemption from such treatment.

The question presents itself whether the right of exemption is forfeited by the attempt of the merchantman to escape capture. All will agree that any form of resistance by such a vessel destroys its immunity. This is true when, for example, an unarmed surface craft attempts to ram its assailant. It is also true, ac-

cording to the Department of State, when an armed merchantman, prior to a summons to surrender, and yet aware of the approach of an enemy warship, uses its armament to keep the enemy at a distance.

The attempt of an unarmed merchantman of any type to escape, either by flight on the surface or by submerging, prior to a signal to surrender or to come to, and with the obvious purpose of keeping beyond the range of a recognized pursuer, does not authorize the latter to attack the vessel without warning. The situation is otherwise, however, when the vessel, although unarmed, is a public ship, or one engaged primarily in a public service connected with the prosecution of the war.

Any belligerent vessel of any kind or type exposes itself to instant attack, if after a reasonable summons to surrender, it persists by any process, in an attempt to escape. After the receipt of such a signal or following the abandonment of flight, in consequence thereof, the attempt to summon aid by wireless telegraph or other process, is analogous to resistance and justifies the enemy in taking summary steps to cause its discontinuance. These might produce a difficult situation, in case the call for aid brought to the scene an armed ship endangering the safety of the enemy or frustrating its attempt to effect a capture. In such a situation, however, the Department of State appears to hold that the mere effort to secure assistance should not alter the obligation of the warship seeking to make the capture to respect the safety of the lives of those on board the merchantman.

As between opposing belligerents, the employment of ruses untainted by perfidy, such as the use by an unarmed ship of a neutral flag in order to prevent the detection of its nationality, does not wholly deprive the user of the right to enjoy an immunity from attack at sight which it would otherwise possess. Thus, the mere flying of such a flag by a vessel still recognized by the enemy as a belligerent unarmed merchantman would not suffice to justify an attempt to destroy it without warning. Even if an opposing warship were in fact deceived by the device, and in consequence failed to avail itself of its power to make an effective summons to surrender, it would not be justified if again sighting the vessel in endeavoring to prevent its escape at all hazards, and to that end, if no other means were possible, in attacking it without warning. Inasmuch as the use of a false flag by an unarmed belligerent ship

is commonly for the purpose of aiding escape by flight rather than of offering resistance, the attempt to deceive, whether successful or unsuccessful, is neither perfidious nor harmful to the pursuer. Detection should not, therefore, excuse attack without warning upon the ship resorting to such a ruse.

The situation is otherwise, however, where the use of the flag by an unarmed ship is for the purpose of alluring a hostile cruiser into waters where it will be subjected to attack by other vessels, or its safety endangered by unknown mines. In such a case it is believed that the vessel resorting to the ruse may be fairly attacked without warning upon the discovery of its design.

The present war has given rise to inquiry whether the existing rules of maritime war with respect to attacks upon unarmed enemy merchantmen are applicable to the operations of submarine naval vessels.

It will be recalled that on February 4, 1915, the German Admiralty announced that the waters surrounding Great Britain and Ireland, including the whole British Channel, were to be deemed a war zone, and that on and after the 18th day of February, 1915, "every enemy merchant ship" found in the zone would be destroyed "without its being always possible to avert the dangers threatening the crews and passengers on that account." Lack of time prevents discussion of our diplomatic correspondence with Germany which immediately ensued.

On May 7, 1915, the *S. S. Lusitania* was torpedoed without warning by a German submarine off the Old Head of Kinsale, Ireland. The vessel sank within 20 minutes. Eleven hundred and ninety-eight men, women, and children were drowned, of whom 124 were American passengers. The cargo was a general one of the ordinary kind, consisting in part, however, of about 5000 cases of cartridges. The ship was unarmed; it carried no masked guns or trained gunners, or special ammunition. It was not transporting troops, and it had violated no laws of the United States. On August 19, 1915, the British liner *Arabic* was torpedoed by a German submarine off the coast of Ireland, and on March 24, 1916, the French channel steamer *Sussex*, while crossing from Folkestone to Dieppe. Both were unarmed passenger ships, attacked without warning, and on board of which American passengers were among the victims suffering injury or death.

These deplorable acts, arousing deep indignation throughout the United States, presented the following problems: whether undersea war vessels could and should be subjected to the existing rules respecting attacks on unarmed enemy merchantmen; whether, even if the foregoing question were to be answered affirmatively, Germany had a valid excuse for not observing them by reason of alleged excesses of its enemies; and whether knowledge of the presence of neutral passengers on board belligerent merchantmen altered the normal obligations of the opposing submarine.

In its first note to Germany after the destruction of the *Lusitania*, the Department of State declared it to be a "practical impossibility" to employ submarines against enemy commerce "without disregarding those rules of fairness, reason, justice, and humanity, which all modern opinion regards as imperative." Thus it was said to be practically impossible for the officers of a submarine to visit a merchantman at sea and examine her papers and cargo and "to make a prize of her"; that if they could not put a prize crew on board of her, they could not sink her without leaving the several occupants to the mercy of the sea in small boats; and hence that manifestly submarines could not be used against merchantmen "without an inevitable violation of many sacred principles of justice and humanity." On July 21, following, the department declared, however, that the previous two months had indicated that it was possible and practicable to conduct submarine operations in substantial accord with the accepted practices of regulated warfare, and that the whole world had looked with interest and satisfaction at the demonstration of that possibility by German naval commanders. Finally, after the series of lamentable events, culminating in the torpedoing of the *S. S. Sussex*, the department renewed the stand which it had taken at the outset, to the effect that the use of submarines for the destruction of enemy commerce was of necessity "utterly incompatible with the principles of humanity, and the sacred immunities of noncombatants." Nevertheless, the United States appears to have demanded and expected an abandonment of the existing "methods of submarine warfare" rather than the use of undersea vessels as commerce destroyers.

If the limited means possessed by a submarine of ascertaining, by any process, the identity or nature or national character or movements of any ship encountered, necessarily involves danger

of indiscriminate attack at sight upon public or private vessels, armed or unarmed, warships or passenger liners, it would be difficult to justify under plea of military necessity the use of such an instrument of naval warfare, unless it be acknowledged that a belligerent may employ any means of reducing its foe. Maritime states have not as yet agreed thus to subordinate the claims of humanity, or so to sanction wanton disregard of unoffending human life. It is not to be anticipated that they will tolerate the removal from any form of war vessels of the duty to apprise itself as to the nature and character of enemy ships encountered as a condition precedent to lawful attack upon them.

If a submarine encounters an unarmed enemy merchantman, normally immune from attack at sight, and not guilty of conduct forfeiting that privilege, no right to attack without warning is apparent. Nor is any to be derived from the difficulty which the former may anticipate in providing for the safety of the occupants of the latter. After giving adequate warning, no destruction of the vessel should be attempted until its occupants are assured of at least a temporary place of refuge. The life-boats offer at best, as the Department of State has indicated, "a poor measure of safety." On numerous occasions great loss of life has ensued when the occupants of a merchantman have, pursuant to orders, endeavored to take to the boats.

The cases of the British ship *Falaba*, destroyed by a German submarine March 28, 1915, the Italian ship *Ancona*, attacked by an Austrian submarine November 7, 1915, and that of the American ship *Healdton*, torpedoed March 21, 1917, may be cited as instances. Recourse to the boats in a heavy sea must always be attended with great danger. Moreover, a life-boat, even if it keeps afloat, affords slight protection from exposure to those long obliged to depend upon it as their sole place of refuge in inclement weather or on an unfrequented sea. Hence the reasonableness of causing passengers and crew of an unoffending merchantman to put to sea in open boats seems to depend upon the presence of special circumstances indicative of the absence of those dangers usually attending such procedure.

Mere incapacity of a naval submarine to offer a place of refuge on its own decks does not justify a disregard of the safety of the persons aboard the enemy merchantman that has surrendered or obeyed a signal to stop. It rather indicates a limitation of the

right to destroy the ship until by some process the safety of its occupants has been assured. Should a small surface craft such as a torpedo-boat destroyer, or a naval vessel even more diminutive, fall in with an enemy passenger liner having 2000 persons aboard, the inability of the former to offer a place of refuge to a majority of those persons, or to spare an adequate prize crew, would not in itself be deemed to justify the demand that the occupants of the liner take to the boats, or otherwise jeopardize their safety, in order to permit the destruction of the vessel on which they were carried. The submarine is subject to the same duty.

In a word, the United States is believed to have taken an impregnable stand in its demand that the normal obligation of a warship not to attack at sight an unarmed enemy merchantman is applicable to undersea vessels, and that hence the right, if any, to employ them as commerce destroyers depends upon the power and disposition of those controlling them to respect that obligation.

In its official correspondence Germany did not assert that the rules of international law respecting the treatment due to unarmed merchantmen were inaccurately enunciated by the United States, or that submarine vessels were incapable of observing them. It was sought to excuse the practices of such vessels on the ground that the conduct of Great Britain was in such sharp defiance of international law that Germany was obliged to have recourse to a ruthless procedure by way of so-called retaliation. It is believed that the sufficiency of this plea depended upon proof that the enemies of Germany were in fact subjecting German merchantmen to treatment similar in kind to that which British and French vessels were being accorded. If British submarines had been attacking without warning German unarmed merchantmen in any zone of hostilities, a situation would have arisen which the United States might have had great difficulty in meeting. The British acts, of which Germany made complaint, were, however, of a widely different character. They did not contemplate the destruction of noncombatant human life on unoffending and unarmed vessels, and hence offered no adequate excuse for the commission of such acts by the enemy. Germany, therefore, owed a duty to every British subject aboard the *Lusitania* and on other British ships of similarly irreproachable conduct, which no acts on the part of the state to which those vessels belonged had served to

lessen. It may be observed, parenthetically, that the presence of neutral passengers on board the *Lusitania* did not alter the duty which Germany owed to that vessel. The obligation not to sink it at sight was one which was due an unarmed merchantman, irrespective of the nationality of its occupants. If the Cunard Company was at fault in encouraging neutral passengers to embark on the ill-fated ship, that fault lay in the failure to warn them that German submarines might not be deterred from wanton disregard of the duty not to sink an enemy merchantman at sight, by even the lawful presence on board of neutral passengers.

In a recent note from Austria-Hungary it is suggested that the necessary warning to a merchantman might be made before the departure of the vessel from port. This would imply that a belligerent has a right to free itself from every duty which the law of nations has imposed upon it with respect to noncombatant and unoffending human life, by giving notice that it will resort to every means in its power to capture or destroy even the unarmed merchant marine of the enemy. In response it may be said generally that the mere giving of notice can never justify lawlessness. To be more specific, however, a belligerent lacks the right to attack and destroy unarmed enemy merchantmen save under conditions which the law of nations, inspired by the dictates of humanity, has definitely established. It cannot modify those conditions at will.

It is unnecessary here to discuss the argument employed by the United States, before it became a belligerent, to combat the German pretensions. It suffices to note that the retaliatory plea was deemed inadequate and unresponsive to the demands of a neutral nation.

The most significant and satisfactory aspect of our diplomatic correspondence with Germany and Austria-Hungary is believed to have been the admissions drawn from both as to the duty of a belligerent, at least under normal circumstances, towards the unarmed merchant vessels of the enemy. On December 29, 1915, the Austro-Hungarian Foreign Office informed Mr. Penfield, in connection with the *Ancona* case, that:

As concerns the principle expressed in the very esteemed note that hostile private ships, in so far as they do not flee or offer resistance, may not be destroyed without the persons on board having been placed in safety, the Imperial and Royal Government is able substantially to assent to this view of the Washington Cabinet.

The assurances given by Germany May 4, 1916, the withdrawal of which, on January 31, 1917, led to the severing of diplomatic relations by the United States on February 3, last, contained the following statement:

In accordance with the general principles of visit and search and destruction of merchant vessels recognized by international law, such vessels, both within and without the area declared as naval war zone, shall not be sunk without warning and without saving human lives, unless these ships attempt to escape or offer resistance.

Here is proof that the rights of the unarmed enemy merchantman are recognized by international law, and that the duty with respect to warning and the saving of human life is as applicable to the submarine of the opposing belligerent as to its surface fighting craft. It is an acknowledgment that the United States has correctly enunciated the law. Whether it is to be maintained or abandoned depends upon the extent of the sacrifice which our country and the Powers with which it is happily in alliance are willing to make. The intensity of our own indignation at defiance of the law of nations is measured by the force we use to compel respect for it. For those of us who were born on this soil it is hard to believe that America is less sensitive to injustice than Europe, or less inclined to fight for principle. Those Americans who to-day, depressed by the conduct of our enemy, declare that international law no longer exists, misjudge the temper of this nation and forget its past. It is unthinkable that the United States, however reluctant to enter the war, will regard peace a blessing, until it has exhausted, if need be, its whole strength, to gain assurance from Germany of the principle that it is entitled to live its life as an independent state when and as long as it respects the law of nations, and no longer.

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“DON'T GIVE UP THE SHIP”

By COMMANDER THOMAS DRAYTON PARKER, U.S. Navy (Retired)

Two facts about the navy we have all known from infancy: Perry used fewer words per unit captured than any man since Cæsar; and Lawrence said, “Don't give up the ship!”

Luck plays its part in the Hall of Fame. Lawrence, like Perry, was built on heroic lines; but 37 years before he lost his life and ship, impetuously fighting when unprepared, another American lost his life, saved his ship, and uttered almost identical words—words that, in his case, have been forgotten. This earlier, uncouth hero is unknown to the vast majority of Americans. Of the early Revolutionary period, he was not a regular naval officer; he lacked the training and the fine presence of a Lawrence or a Decatur; he swore horribly—and with it all he “did his bit” in a very heroic way.

The captain in question was James Mugford of Marblehead, one of the first sea victims of the Revolution. Not even a tugboat bears his name.

When the Revolution began, Mugford, aged about 36, was impressed by the British and confined on a warship in his home port. While a prisoner he heard talk of a powder ship expected by the British; and when released through the importunities of his young wife he made plans to capture this vessel. Being active and enterprising (in more ways than one) he secured the command of an armed schooner, the *Franklin*—a terrifying craft of 50 to 75 tons. Her armament, which left little space for stores or crew, consisted of six carriage guns, a number of swivel guns,¹ etc. The crew numbered 17.

Mugford hardly had his commission, signed by General Ward in command of land forces at Boston, when the general, hearing

¹ General Ward's report. Other accounts refer to four 4-pounders, etc.

"damaging rumors," sent an express messenger to cancel it. But Mugford, who was a man of action, had sailed with the *Franklin*.

Near Boston he promptly fell in with his powder ship, the Britisher *Hope*, Captain Lumsdale, of 300 tons and a crew of 21 men. Accounts as to her armament differ. Mr. Roads, a Marblehead chronicler, gives this as six guns; the inscription on the Marblehead monument says 10; other historians give other figures. At any rate, being from four to six times as large, she was at least a fair match for the *Franklin*. Moreover a British squadron under Commodore Banks was lying in the offing, in Nantasket Roads. Realizing the bigness of his enemy and the danger from a supporting squadron, Mugford warned his crew that they were in for a desperate fight—but the British captain surrendered promptly, preferring strategy to fighting. In fact, Mugford on boarding found him in the act of cutting the topsail ties and halliards.

"Mugford heard the orders, and knew the consequence of executing them—that the sailing of the ship would be so long prevented that the men-of-war's boats would recover her. He therefore opened with a volley of oaths and execrations: and in the most horrid manner threatened the captain and all on board with immediate death if the orders were executed, upon which the captain was so terrified as to desist."²

The capture was a most important one. Washington, in desperate need of ammunition, secured from the *Hope* 1500 barrels of gunpowder, 1000 carbines, a number of gun carriages, and a large assortment of pioneer tools and artillery instruments. The prize ran aground in Pulling Point Gut and, as a precaution, was unloaded by boats.

Having delivered the booty, Mugford put to sea in the *Franklin* and anchored (or grounded) off Pulling Point. The *Lady Washington*, a small privateer that left in company, anchored close-to. Mugford then prepared for eventualities by getting springs on his cables, tricing up boarding nettings, and red-heating a quantity of 12-pound shot. Meanwhile the enemy, scenting an opportunity, decided to attack. During the night a stealthy ripple of oars was heard, and dim shapes of boats were sighted. The British were approaching with 13 or 14 boats and 200 armed men.

² Gordon's *American Revolution*, I, 71.

Mugford hailed.

"For God's sake don't shoot!" was the reply. "We are friends from Boston come to help you."

Mugford was too shrewd a Yankee to be caught by this simple trick; and while profanely denying any wish for "help," he delivered his broadside. Though several boats were sunk, the survivors piled alongside the *Franklin* and *Lady Washington*. Mugford's men dropped red hot cannon balls on their heads; and as they tried to hold on with hands instead of grappling irons, lopped off the hands in rapid succession. General Ward's report credits Mugford personally with *five pairs*; and one sailor boasted of nine.

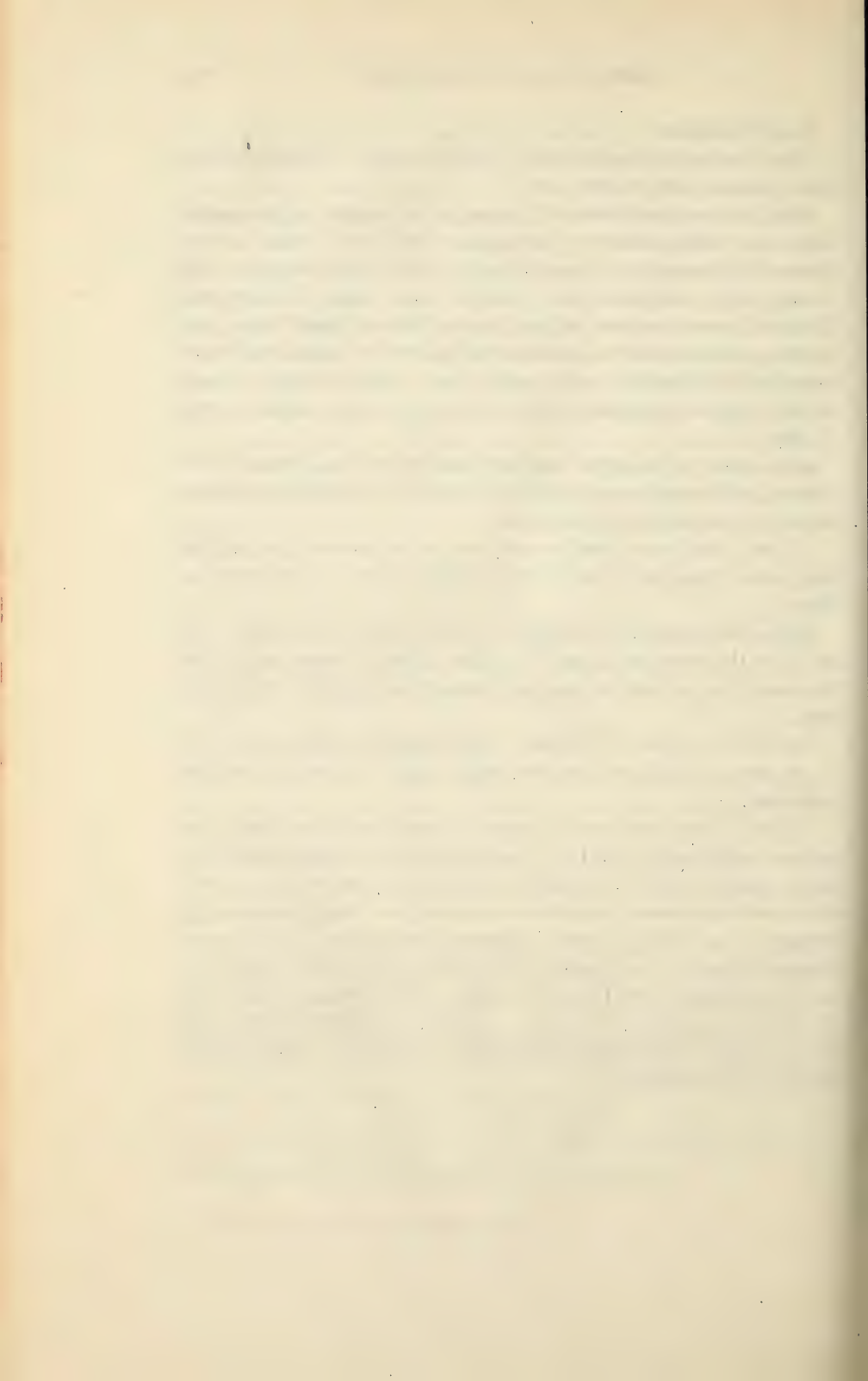
In the thick of the fight Mugford was shot or run through with a lance, and mortally wounded. As they were passing him below to die, he painfully told the mate:

"I am a dead man; *but do not give up the vessel*; you will be able to beat them off; if not, cut the cable and run the schooner on shore!"

Not so terse and well-rounded as "Don't give up the ship!" or as "Give the men their grog!" (if that is what Nelson said)—but fine enough in sentiment, complete enough *in thought*, for a dying man.

They did not give up the ship. The British retired with a loss of 70 men. Mugford and one other were the only American casualties.

Of two brave men one is known everywhere, the other forgotten except locally. Why? Lawrence was a regular commanding a regular ship in a regular war; his personality was picturesque and impressive; his fight was spectacular. Mugford planned, prepared, and showed good judgment throughout. With great personal courage, he fought a brave and successful fight after securing results of real military value. Overcoming great odds, he inflicted casualties of 35 to 1. And yet, though his home city has given him a monument, he classifies merely as "a little-known hero of the Revolution."



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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

DENTISTRY IN THE OLD NAVY

By SURGEON F. M. BOGAN, U. S. Navy

"Talking about pulling teeth," said a naval surgeon, "the most remarkable extraction I ever made was down on the Mosquito coast. I was on a gunboat which had taken down surveyors who were trying to find the best place for the Isthmian Canal. At San Blas the Indians were hostile, so our captain anchored there for awhile to protect the surveyors.

"The Indians used to come out in their canoes and remain all day gazing silently at the gunboat. They caught many fish and we could see chickens ashore, but we could not induce them to barter or sell anything. And I can tell you we would have given a good deal for a fresh egg or two.

"Our executive officer was a talented fellow who had a marvelous gift for acquiring languages. He used to stand by the rail for an hour or so each day and try to converse with the Indians in the canoes. At the end of a week he showed me a little book containing more than a hundred Indian words, and very soon he was able to carry on quite a conversation with them. Among other things he told them there was a great medicine man on board who could cure anything, and said how glad he would be to do anything for his friends, the Indians.

"It so happened that just at this time the big chief of the tribe ashore developed a toothache. After his medicine man had exhausted all his charms and the tooth kept on aching, the big chief, accompanied by all the male members of his tribe who could be crowded into canoes, came on board to be treated. I tried with the few dental instruments I had to extract the molar, but it was nothing but a snag and the forceps slipped off. Then I borrowed a mallet and wedge from "chips" and applying the wedge to the side of the tooth I struck the other end with the mallet and con-

tinued to drive the tooth back and forth until it was loose enough to remove with the forceps. During all this painful process the big chief never even grunted. When the tooth was out he passed it among his retainers with a pleased smile and then without comment the whole crowd left the ship.

"The next morning the chief came on board with six plantains and three eggs, a present for the great medicine man who had extracted his tooth. He also brought with him a single-barrel gun which when new might have cost as much as 90 cents. This gun had an impediment in its hammer action. The hammer came down half-way, then stopped, and after deliberating awhile completed the journey, but of course had not sufficient force to explode the cap. The big chief's line of reasoning no doubt was, the medicine man cured my tooth, let him now cure my gun."

U. S. NAVAL INSTITUTE

SECRETARY'S NOTES

Prize Essay The Secretary of the Navy disapproved, for the
1918 present, the publishing of the Prize Essay of 1918,
subject, "Letters on Naval Tactics," by Lieutenant
H. H. Frost, U. S. Navy. The Navy Department
does not approve of the publishing of articles written by naval
officers on the subjects of strategy and tactics during the con-
tinuance of the present war.

Prize Essays The attention of all the members and the sub-
1919 scribers to the U. S. NAVAL INSTITUTE PROCEED-
INGS is invited to the new rules governing the Prize
Essay contest for 1919 under the heading of Special
Notice in this number. It is requested that authors who are writ-
ing or who contemplate writing essays submit them at their earliest
convenience, as the Institute is in pressing need of articles for pub-
lication in the PROCEEDINGS.

Dues It is requested that members who have not paid their
1918 dues of \$2.50, do so at their earliest convenience.

Address of Because of the fact that many copies of the PRO-
Members CEEDINGS are being returned by the Postal Authori-
ties, *all members are urged to keep the Secretary and*
Treasurer informed of the address to which PRO-
CEEDINGS are to be sent, and thus insure their receipt.

This precaution is now of particular importance as notices of
changes of stations are not now available for the use of the In-
stitute's staff.

Members and subscribers are urged to notify the Secretary and
Treasurer promptly of the non-receipt of PROCEEDINGS, in order
that tracers may be started. The issue is completed by the 20th
of each month.

Member-ship Since December, 350 regular members, 25 associate members and 1 life member have joined the Institute.

Deaths:

Mr. George von L. Meyer.

Lieutenant E. W. F. Childs, U. S. Navy.

Resignations: One.

Book Announcements Attention is invited to the List of Book Publications for a complete catalogue of books revised and republished by the INSTITUTE.

The Landing Force Manual, U. S. Navy, 1917, is being compiled by a board of officers and will be ready for distribution shortly after the compilation has been completed, probably August 1, 1918.

The Manual of Wireless Telegraphy has been revised and is ready for distribution under the title "Robison's Manual of Radio Telegraphy and Telephony."

Navigation and Compass Deviations, by Lieut. Commander W. C. Muir, has been revised and is ready for distribution.

The Handy Book for the Enlisted Men of the Engineering Department is now in press and will be ready for issue about May 1, 1918.

Discount on Books The five per cent additional discount allowed to purchasers of books whose accounts during a calendar month amounted to a hundred dollars or over has been discontinued.

Book Department The Institute Book Department will supply any obtainable book, of any kind, at retail price, postage prepaid. The trouble saved the purchaser through having one source of supply for all books, should be considered. The cost will not be greater and sometimes less than when obtained from dealers.

Suggestions Invited Comment and suggestions relative to the make-up of the PROCEEDINGS are invited from all members interested in the welfare of the Institute. It is believed that the scope of usefulness of the PROCEEDINGS to members can be increased and all members are invited

to assist in this work. Should any topic, on which you think an article could well be written, occur to you, send it to the Secretary and Treasurer, together with such explanation or comment as may appear desirable in order that the intent of the suggestion may be clearly understood.

The attention of authors of articles is called to the fact that the cost to them of reprints other than the usual number furnished, can be greatly reduced if the reprints are struck off while the article is in press. They are requested to notify the Secretary and Treasurer of the number of reprints desired when the article is submitted. Twenty copies of reprints are furnished authors free of charge.

Authors of articles submitted are urged to furnish with their manuscript any illustrations they may have in their possession for such articles. The Institute will gladly co-operate in obtaining such illustrations as may be suggested by authors.

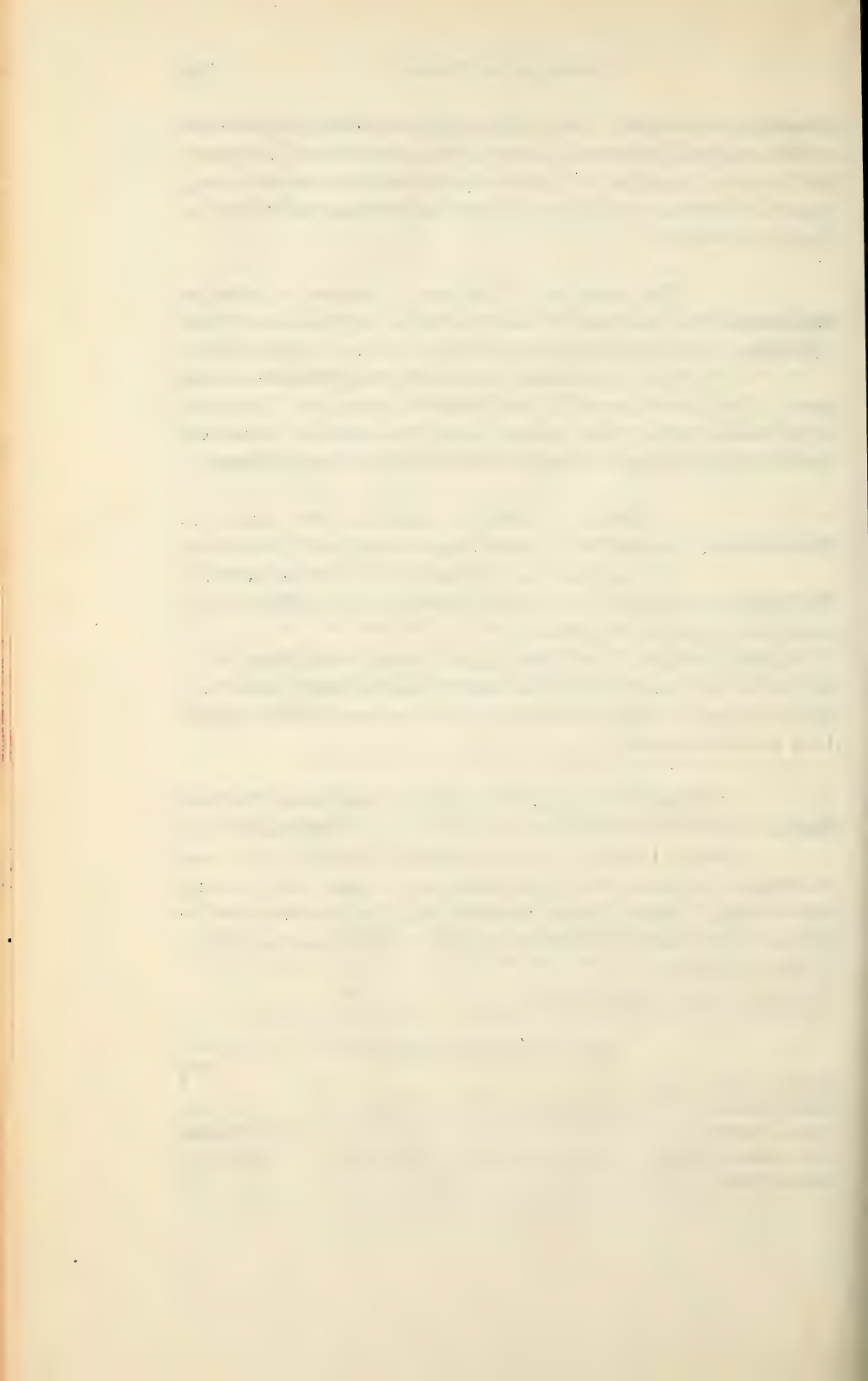
Original photographs of objects and events which may be of interest to our readers are also desired, and members who have opportunities to obtain such photographs are requested to secure them for the Institute.

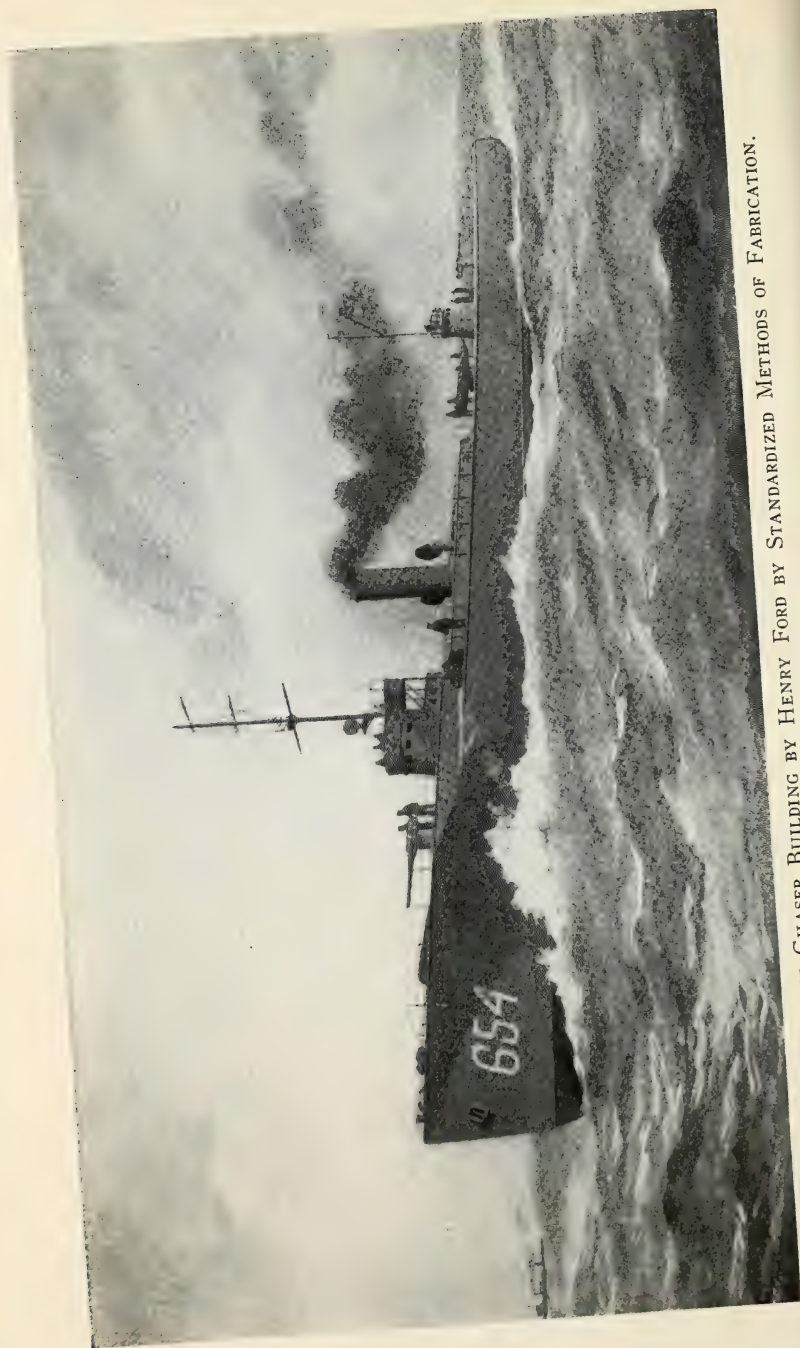
Whole Nos. 145, 146, 147, 149, 155 and 166 of the PROCEEDINGS (March, 1913, June, 1913, September, 1913, January-February, 1914, January-February, 1915, and November-December, 1916) are exhausted; there are so many calls for single copies of these numbers that the Institute offers to pay for copies thereof returned in good condition at the rate of 25 cents per copy.

ANNAPOLIS, MD., March 22, 1918.

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TYPE OF SUBMARINE CHASER BUILDING BY HENRY FORD BY STANDARDIZED METHODS OF FABRICATION.

PROFESSIONAL NOTES

PREPARED BY

LIEUTENANT W. B. JUPP, U. S. NAVY

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BRAZIL

SPIRITED ACTION OF BRAZIL.—Admiral Pronti has been appointed commander-in-chief of the Brazilian fleet to cooperate with the Allied fleet in European waters.

Commenting on correspondence which has passed between Senhor Nilo Peçanha, the Brazilian Foreign Minister, and Sir Arthur Peel, the British Minister, on the subject of Brazil's naval contribution to the war, the *Journal do Commercio* says:

"It is the firm intention of Brazil to take part, on the one hand by sending airmen to England, and on the other by sending squadrons of cruisers and destroyers. Although modest, our contribution signifies much, and, if it is necessary, it will be augmented in accordance with our honor and the traditions of this people, which has never shirked the accomplishment of its great duties.—*Reuter*."

The Brazilian Navy, which is for the most part, of British construction, consists of two battleships, five cruisers, two coast defence ships, four torpedo-gunboats, two gunboats, 10 destroyers, five torpedo-boats, submarines, and river monitors and gunboats. The battleships *São Paulo* and *Minas Geraes* were laid down in 1907, the first at Barrow and the second at Elswick, and have a speed of 21 knots. Their armament includes twelve 12-inch guns in pairs in turrets, and twenty-two 4.7-inch, and they have a displacement of 19,281 tons. Two of the protected cruisers—the *Bahia* and *Rio Grande do Sul*, both built in 1909 at the Elswick yards—are of 3100 tons. They developed a speed of 27 knots on their trials, and are armed with ten 4.7-inch guns. The *Barroso*, also Elswick-built, is of 3450 tons, has a speed of 20 knots, and carries six 6-inch, four 4.7-inch, ten 6-prs., and four 1-prs.; the *Tamandare*, constructed at Rio de Janeiro in 1890, is of

4537 tons, her speed is 17 knots, and her armament ten 6-inch, two 4.7-inch, and eight 1-prs.; and the *Benjamin Constant*, of French construction, is of 2707 tons, has a speed of 15 knots and carries four 6-inch, eight 4.7-inch, two 6-prs., and two 1-prs. The destroyers have a speed of over 27 knots.—*London Times*, 1/2.

BRAZIL TO COOPERATE WITH ALLIED NAVIES.—Admiral Pedro Pronti has been placed in charge of the Brazilian fleet which will cooperate with the Allies in European waters, according to a recent announcement.—*The Naval Monthly News*.

The Brazilian fleet which is to cooperate with the Allied fleet in European waters consists of two battleships, five cruisers, two coast defence ships, four torpedo-gunboats, two gunboats, ten destroyers, five torpedo-boats, submarines, and river monitors and gunboats.—*Army and Navy Gazette*, 9/2.

CHINA

ALIEN SHIPS AT SHANGHAI TURNED OVER FOR THE USE OF THE ALLIES.—Two German and Austrian ships which have been interned at Shanghai have been allotted to the United States, according to an unofficial dispatch on January 5 from Shanghai. They are the *Silesia* and the *China*. Of the other ships interned there, the *Bohemia*, *Albenga* and *Triumph* will go to Japan, the *Deike Rickmers* to Italy, the *Dathe* to France, and the *Sexta* and *Helene Richkmers* to Great Britain. The *Silesia* and the *China* are the largest, being 5174 and 6026 tons respectively.—*The Naval Monthly News*.

FRANCE

FRANCE REQUISITIONS HER MERCHANT MARINE.—A decree published in the *Journal Officiel* to-day provides for the requisitioning of the entire merchant marine of France on March 10.

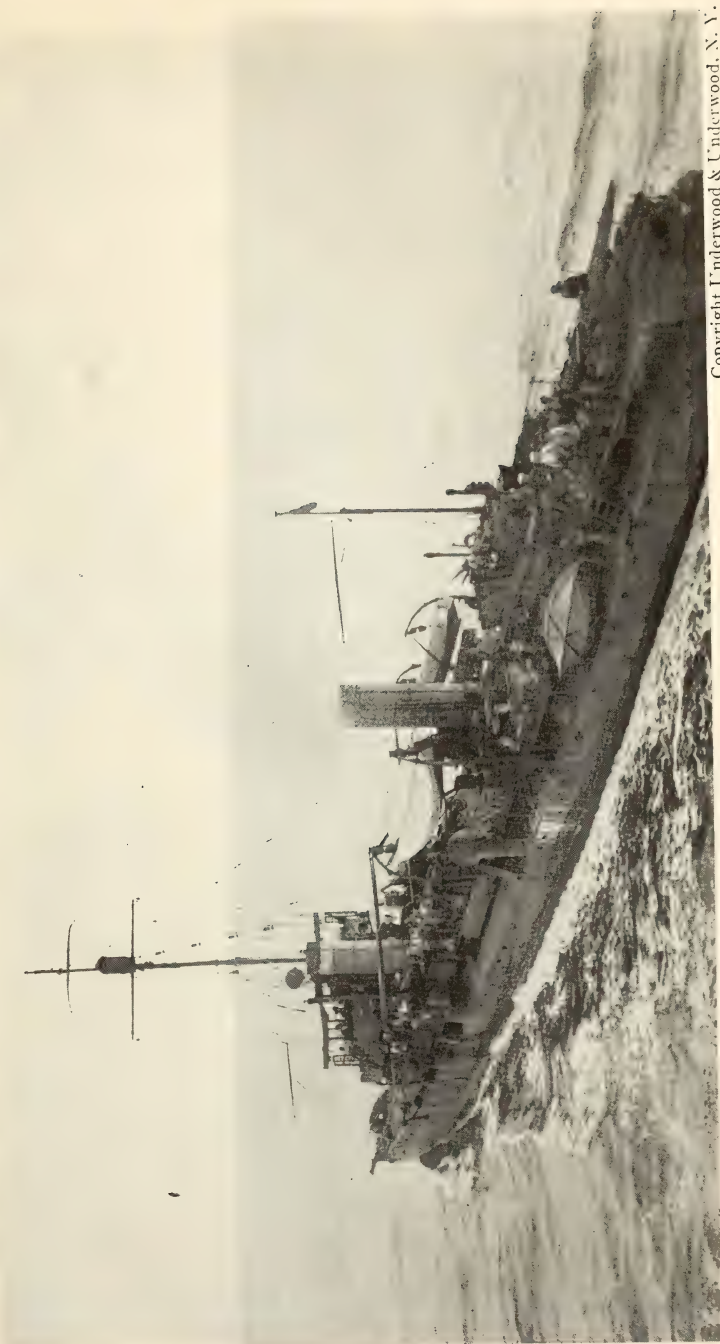
Government commissioners will confer with the shipowners as to the conditions under which the government will take over the vessels.—*Washington Evening Star*, 16/2.

FRENCH BUILDING MINE-SWEEPERS IN AMERICA.—Thirty-six mine-sweepers will be constructed for the French Government by the Foundation Company of Savannah, Ga. The ships will be completed in six months. They will be of steel, 150 feet long.—*The Naval Monthly News*.

FRENCH SHIPPING.—Authoritative statistics show that France had under her flag 2,498,286 gross tons of shipping at the outbreak of the war, 28 per cent of which up to September 1, 1917, or 699,948 tons, had been lost through war causes. To offset this 51,319 tons have been built in French yards and 134,978 tons have been purchased abroad. Outside the war losses, 52,000 gross tons have been erased from the register through causes aside from the war, making a total shrinkage of 751,048 and a net shrinkage of 564,851, which left under the tri-color on the date mentioned 1,983,535 tons.—*Marine Journal*, 9/3.

GERMANY

GERMANY WILL USE BLACK SEA SHIPPING.—Advices received from Berlin say that it was announced in the joint sitting of the Reichstag that it was intended to resume shipping in the Black Sea after the mines have been cleared away. The scheme is to expedite shipments to Germany from the Ukraine, Germany to supply agricultural machinery and implements in return for grain.—*N. Y. Herald*, 23/2.



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FRENCH TORPEDO-BOAT DESTROYER CRUISING AFTER GERMAN SUBMARINES.
(NOTE RAISED DECK.)

GERMANS RUNNING SHORT OF AIRCRAFT WOODS AND CLOTH.—The Germans are running short of suitable materials for their airplanes and are using inferior timber and textiles. This important fact has been revealed by the captured German airplanes which have been sent to this country for study by aviation experts.

The materials now being used by the Germans are far inferior to those demanded by American specifications. The wing beams of the captured planes were made of thin pieces, less than an inch in thickness, put together with glue and nails. American specifications require solid beams of the finest and toughest spruce. Wings of the German planes are covered with a fiber cloth instead of the stout linen demanded here.—*N. Y. Herald*, 28/2.

DISORDERS IN GERMAN FLEET.—Fresh disorders have occurred in the German fleet off the Aland Islands, according to the Russian military newspaper, *Krasnaya Armia*.—*Washington Post*, 17/3.

HUN POLICY TO ATTACK NEUTRAL SHIPPING.—Sinking of neutral shipping by German submarines has two purposes, according to a statement issued by the war trade board. One is to cut off supplies from America, thus making the neutrals dependent for food on German good-will, and the other is a deliberate plan to destroy neutral shipping to the end that Germany may have advantage in the after-the-war struggle for trade.

Coincident with issue of the statement the war trade board announced regulations which are to govern shipments to Holland under the plan for seizure of the Dutch ships. All shipments not consigned to the Dutch Government itself must be consigned to the Netherlands Overseas Trust Company. Certificates obtained from the Overseas Trust by prospective importers must be forwarded to prospective exporters in this country, who, in turn, will apply to the war trade board's bureau of exports for a license.

The war trade board's statement regarding the sinking of neutral shipping is as follows:

"Germany's war leaders are using the submarine war weapon to prevent fulfillment of American agreements to feed and relieve European neutrals. A mass of cumulative evidence and indications in the possession of the war trade board show that Germany is employing the submarine menace to prevent neighbor neutrals receiving any food or favors at the hands of the United States and its associates in the war, and to coerce these neutrals, through starvation, into political and economic dependence upon Germany quite as much as to strike at the communications of its opponents—Germany's ostensible aim in proclaiming the ruthless submarine campaign.

"Further, indications tend to show that the submarines are being used, along similar dog-in-the-manger lines, to destroy neutral shipping without regard to its employment in order to weaken prospective neutral competitors after the war and to drag down neutral tonnage as far as possible toward a position of equality (or inferiority) with the German mercantile marine, which has lost between 40 and 50 per cent of its ocean tonnage, so that the neutral trader may be equally as badly off as his German rival for tonnage in the after-the-war race for commerce.

"No other interpretation can be placed, for example, upon the repeated instances of destruction of neutral Danish ships on voyages between Iceland and the Danish mother country, entirely outside of the war zone, nor upon the multitudinous 'mistakes' whereby Dutch and other neutral ships clinging to the precarious narrow way left open through the prohibited zone are torpedoed outside the zone by U-boat commanders, whose word that the vessels were within the zone is later accepted unquestioned by the German prize courts.

"Prominent shipowners in Scandinavian countries have stated their belief that many sinkings were inspired only by the intention to get rid of neutral tonnage so as to increase the relative value of German shipping available at the end of the war. Examinations of the captains of torpedoed ships before the marine courts in these countries bear out this belief, the testimony repeatedly showing that vessels were attacked far outside the zone.

"The intent of the Germans to prevent neutrals receiving food and supplies under relief agreements concluded with the United States is illustrated by the German veto placed upon the temporary *modus vivendi* with Holland, providing for the provisioning of that country. Two food ships loaded with supplies for the Netherlands along with 11 Belgian relief ships have been waiting in American ports for weeks unable to sail because of the refusal of Germany to permit an equivalent amount of tonnage leaving Dutch harbors, the obvious plan of the German authorities being to gather all Dutch ships into home harbors and then prevent any of them sailing, by threats to torpedo any vessel leaving Holland waters. To relieve the food situation in Holland the war trade board has finally authorized the transshipment of the food in question from the two Dutch steamers to the Holland liner *Nieuw Amsterdam*, which is sailing shortly.

"The present campaign of threats and intimidation against the Scandinavian neutrals now carried on in the semi-official *North German Gazette* and other organs of the German press is obviously intended to frighten the northern neutrals from completing agreements which benefit the neutrals quite as much as the United States and its associates.

"Now, success of the earnest efforts of the United States Government to rush shipments of bread grain to Switzerland is threatened by the action of German submarines, which, according to now fully confirmed reports from Switzerland, have made a start on a new policy of ruthlessness by sinking the neutral Spanish steamer *Sardinero*, secured with great difficulty to carry food to that country. The torpedoing of the *Sardinero*, carrying nearly 4000 tons of cereals for Switzerland, can, by no stretch of the imagination, be brought within the scope of Germany's proclaimed submarine policy, since the vessel was engaged not in an enemy but in a supposedly safe trade for a neutral state, was en route to a port to which Germany had explicitly promised to leave open a safe passage and was torpedoed outside of the prohibited zone.

"To add to the deliberateness of the offence, the *Sardinero* was destroyed after the submarine commander had made a thorough examination of the ship's papers and convinced himself of the nature and destination of the cargo, so that no plea of a 'mistake' can be entered by Germany. The evident intent and result of the act was to prevent Switzerland, whose urgent and immediate need for food is well known to Germany, from receiving the American grain; to destroy a Spanish ship for after-the-war trade and to raise by this much the relative value and importance of each German ship afloat at the end of the war.

"By the Swiss-American agreement of December 5, the Allies guaranteed to Switzerland for its admittedly urgent needs an eight months' supply of 240,000 tons of cereals, subject to the assumption that Germany would safe-conduct the supply ships as specified in its proclamation on ruthless submarining, which provided a safe route to the Mediterranean port of Cette and promised that submarines would not molest such vessels. To accelerate delivery and provide for immediate necessities before grain from the Argentine, the natural source of supply, could reach Switzerland, the war trade board even procured from the scanty supplies in this country 30,000 tons of grain which had been earmarked for the Allies and allocated it to Switzerland, arranging to replace it later by grain from the Argentine, and had further proved its good faith and desire to help out dependent neutrals by successful efforts to secure tonnage to transport the grain.

"The plans even contemplated bringing the ships back in ballast from Cette to accelerate shipments and remove any pretext for German submarine interference with the ships, either going or coming.

"It is hoped that Switzerland and other neutrals will contrast the respective attitudes of Germany and the United States toward the problem of feeding the neutrals, and will take due notice of this latest attempt of Germany to intimidate neutral ship owners, through ruthless submarining, from carrying food to Switzerland. They will also note the same German spirit toward Holland, which Germany seems determined to prevent receiving food supplies, except upon German terms."—*Washington Evening Star*, 15/3.

GREAT BRITAIN

MUST DARKEN ALL SHIPS.—*British Admiralty Demands This Precaution Against Night Attacks.*—Vital importance is attached by the British Admiralty to the darkening ships, as explained by Sir Eric Geddes in his statement in the House of Commons last Tuesday. The Admiralty desires that the fullest possible publicity be given to the First Lord's remarks by placarding and otherwise. It urges that protective measures as prescribed be carried out immediately and implicitly.

Regarding the screening of lights on ships at night, Sir Eric Geddes, in his statement Tuesday, said:

"I am greatly concerned at the increased number of vessels lost at night, not only on moonlight nights, but on nights of complete darkness. Unless the ship is completely darkened in accordance with Admiralty orders night is no help against the submarine. In fact, the slightest visible light is an excellent target. I appeal to the shipowners and shipmasters to heed three points: First, obey instructions; second, keep a good lookout; third, thoroughly darken the ship."—*N. Y. Times*, 10/3.

Recently the British Government abandoned its policy of suppressing the figures in regard to Britain's shipbuilding output in 1917 and allowed Mr. Bonar Law to announce in the House of Commons that 1,163,474 tons of new ships had been turned out last year. This falls far short of the 1,900,000 tons which Lloyd George in August predicted would be launched. Lack of men and materials and changes in plans of vessels are given as the causes for this lessened output. Of the new tonnage built, 484,000 tons were constructed in the first half and 680,000 tons in the second half-year. Despite all the government's efforts at speeding up shipbuilding, therefore, gain in output during the last as compared with the first half-year was comparatively small. Nevertheless, merchant tonnage built in 1917 showed an immense advance over the meager totals of 688,000 and 538,000 tons attained in the two immediately preceding years, and clearly indicates that the British authorities are trying to atone for their past neglect of the shipbuilding industry. Undoubtedly, they were lulled into overlooking this important branch of national defence by the fact brought out by Lord Curzon that Great Britain was able to offset her losses in tonnage down to the close of 1916 by constructing new ships both at home and abroad, by purchasing vessels from foreign owners, and by confiscating enemy craft. Not until the start of Germany's ruthless submarine campaign did the British Government realize apparently the dependence of the nation upon ships.—*Nautical Gazette*, 21/2.

The principal reason heretofore advanced by the British Government for refusing to publish from week to week the names of vessels sunk by German submarines has been that the enemy would be materially aided if such information were given out. In allowing the total tonnage built in the United Kingdom and elsewhere in 1917 for British interests to be stated, however, those in authority have perhaps unwittingly revealed the extent of

the losses incurred last year by British shipowners as a result of U-boat depredations. Assuming Lord Curzon's assertion to be true that Britain's pre-war tonnage of 16,900,000 tons of ocean-going ships had suffered no impairment so late as the close of 1916, we know from a semi-official statement that this tonnage underwent a diminution of 2,750,000 tons in 1917. This represents losses by enemy action or otherwise less tonnage newly constructed or purchased. As Mr. Bonar Law has informed us, this last-mentioned tonnage amounts to 1,333,000 tons. Adding this newly constructed or purchased tonnage to the net loss incurred of 2,750,000 tons, a total of 4,083,000 tons results, which represents the losses suffered by the British mercantile marine from all causes in 1917. Probably U-boat sinkings make up nineteen-twentieths of these losses. Now that the British Government has itself let the cat out of the bag and divulged to the world the extent of the damage inflicted by enemy submarines on British shipping, no good ground exists for the Admiralty authorities persisting in their attempt to hide the tonnage sunk by the U-boats. Yet, even though its futility has been exposed, they continue to adhere to the policy of concealing losses.—*Nautical Gazette*, 19/2.

NORWAY.

SCANDINAVIAN SHIPPING LOSSES IN 1917.—As Norway, next to Great Britain, maintains the largest number of cargo carriers, and, during the war, has strictly preserved her neutrality as against Germany, the tale of her shipping losses is a lurid commentary on the policy of the power which professes to be promoting "the freedom of the seas." During the past year alone 401 of her seamen have been murdered on the high seas, while 258 are missing. Of ships, 434 have been sunk, representing a tonnage of 686,862 tons. Sweden, whose neutrality as regards Germany has been more or less benevolent, earned no particular consideration on that account, certainly not at sea. For, in 1917, 61 Swedish vessels were sunk by enemy submarines and 80 Swedish seamen drowned. As compared with Norway's totals Sweden's are small, but then she is nothing like so important as a maritime state. If, as Mr. Havelock Wilson says, Norwegian sailors are as determined as British seamen to bring retribution home to the enemy in peace terms, the compensation he will have to pay will be heavy.—*Army and Navy Gazette*, 2/2.

RUSSIA

RUSSIAN BALTIC FLEET DESERTED AT HELSINGFORS.—The whole Russian Baltic fleet is lying at Helsingfors, Finland, the Petrograd correspondent of the *Times* cables, but the crews have melted away, only a watch being left for each ship. The dreadnoughts will soon start for Kronstadt, but the remainder of the fleet will remain in Finland.

The correspondent also says that all movable articles from the cruisers *Aurora* and *Diana*, lying in the Neva River, on which Petrograd is situated, have been carried away by sailors.

The *Aurora* and the *Diana* are sister ships of 6731 tons displacement, built in 1896.

A Russian wireless statement has been received here signed by Tchitcherin, who for a time was held in prison in England for circulating seditious propaganda and later reported to have become Bolshevik Commissioner for Foreign Affairs. The message was addressed to the German, Austro-Hungarian, Bulgarian and Turkish governments, and read:

"In the Baltic the Russian transport ships *Russ*, *Nitava*, *Pallada*, *Merkury*, *Lakh*, *Okean*, *Biana* and *Zhulash* have been placed under the Red Cross flag and will be used exclusively in that service."

A dispatch to the *Exchange Telegraph* from Copenhagen, dated Monday, says:

"The Finnish Premier, Judge Svinhufvud, has arrived in Berlin, having made his escape from Helsingfors, where it is reported the Red Guards have

moved their headquarters to the Sveaborg fortress, indicating that they are unable to defend the capital.

"Mr. Lindhagen, the Mayor of Stockholm, who is in Helsingfors, reports that the Red Guards have rejected mediation by Sweden."—*N. Y. Herald*, 13/3.

BALTIC-BLACK SEA CANAL IS PROJECTED.—The commercial agreement between Germany and Russia will contain provisions for the construction of a canal which would form the connecting link of a waterway between the Baltic and the Black Sea, according to a Berlin dispatch to the *Politiken*. The cost is estimated at 20,000,000 marks and German financiers, it is said, are ready to provide the money.

[The foregoing apparently has reference to some scheme by which the rivers Dvina and Dnieper might be connected, forming a waterway from the Baltic through the Gulf of Riga to the Black Sea to the east of Odessa, cutting through the heart of western Russia and the Ukraine.]—*N. Y. Herald*, 13/3.

MAY MOVE CAPITAL EAST OF MOSCOW.—The Russian revolutionary government is prepared to move from Moscow to some point further east if the German armies continue to advance into Russia. A message to the State Department recently from Madden Summers, the American Consul at Moscow, dated March 8, said the government was expected there next day and that arrangements would be made to go to some other city if it became necessary.

A cablegram from Ambassador Francis at Vologda, which said nothing of any intention to move the American Embassy staff further east, apparently disposed of reports that the ambassador was preparing to leave there.—*N. Y. Herald*, 13/7.

UNITED STATES

BUILDING

"EAGLE" CLASS DESTROYERS.—Henry Ford is using his big plant at Detroit to build submarine chasers, and in almost incredible time he has promised that a big fleet of these boats will be ready to drive the German U-boat from the seas and make the seas safe for ocean traffic. Just how many are to be built is not announced but it has been intimated that the number is more than 200. In the same way the exact dimensions are not given by the Navy Department but, roughly, these boats will be between 150 feet and 200 feet in length and they will be nearer 200 feet than 150 feet. They are to be driven by steam turbine engines; steam will be generated in tubular boilers which will use oil as fuel. They are to make about 25 knots and their armament will consist of two 4-inch guns—one forward and one aft—and two anti-aircraft guns mounted in the waist of each vessel. They will be equipped with the most delicate microphones, which will tell the location of submarines. This instrument has been perfected by Thomas A. Edison.

These boats, with the 359 submarine chasers now completed, which are driven by two Standard engines, the original fleet of torpedo-boat destroyers which were built or authorized before the war began, and the hundreds of other destroyers which are being built as fast as possible in the largest shipyards, will make a formidable fleet which will play havoc with the submarines of the enemy and assure safe convoys to the many cargo boats that are to cross the Atlantic carrying supplies and munitions to the American Army in France and to the Allies.

Some months ago, William Gardner drew the plans of a submarine chaser or small destroyer which was submitted to the Navy Department. This vessel, about 150 feet in length, was very favorably commented on by

the naval expert designers and constructors, but the trouble was to get it built. It is understood that Mr. Gardner's designs furnished the scheme for the new boats and the department, after making some changes which would make the boats even more serviceable, suggested that a fleet should be built.

A story is circulating in naval circles which tells how Ford happened to be selected to build the boats. The plans had been accepted by the Naval Board but the construction chiefs were in despair.

"How can we build these boats?" they asked. "Every shipyard in the country has all the work it can handle. If we let the shipbuilders have contracts for these boats we will have to hold back work on the destroyers or else have a row with the Shipping Board to obtain some of their ships. We can't start new yards because we have not enough men in present yards to operate them properly."

While the naval officers were worrying, Henry Ford, who had heard about the new boats, came to their rescue. He offered to build the boats in his plant near Detroit. The naval men asked how he could do it without shipbuilders.

"Leave that to me," replied Mr. Ford, but not in so few words. The offer was accepted, the work began at once, and the first keel was laid in 20 days.—*Rudder*, March.

BIG U. S. SUBMARINE RENAMED.—The seagoing submarines of the American Navy will be numbered under a double letter system, it was announced recently at the Navy Department. The first of this type—the 1000-ton submersible *Schley*—has been renamed the *AA-1*, and a destroyer has been given the name of *Schley*.

The smaller submarines retain the single letter to denote the type, with the number attached to denote the individual boat. As new types are developed they will be given the additional letters of the alphabet. Large submarines succeeding the *AA-1* and differing from that vessel in type will be designated as the *BB* or *CC* or *DD* class. Some of the original *A* class of smaller submarines are still in operation in Philippine waters.—*Washington Post*, 17/3.

FOUR NEW NAVAL DESTROYERS NAMED.—Four new naval destroyers have been named in honor of Rear Admirals William Radford of Virginia, John B. Montgomery of New Jersey, Charles S. Boggs of New Jersey, and A. H. Kilty of Maryland, all of whom rendered distinguished service for the government.—*Evening Star*, 2/7.

PHILIPPINES TO BUILD NAVAL CRAFT.—Gov. Gen. Harrison has signed a bill authorizing the flotation in the United States of a \$2,000,000 bond issue. The money will be used to finance the construction of the torpedo-boat *Rizal* and one submarine, to be given by the Philippines to help America in the war.

James J. Rafferty, former director of internal revenue, has been sworn in as director of Bureau of Commerce, established by the last legislature. J. Trinidad has been appointed director of internal revenue. He is the first Filipino to occupy the post.—*Evening Star*, 23/2.

PLANNING FOR THE FUTURE.—The growth of the navy, furthermore, has just begun. The Navy Department is carrying out the largest warship construction program in history, which will embrace nearly 1000 vessels, including those of all types building or arranged for. Some months ago Secretary Daniels stated that we were building or had contracted for no less than 424 war vessels, in addition to the hundreds of submarine chasers of smaller type. Since that time, contracts have been given for more destroyers and a large number of the new type of steel submarine fighters Henry Ford is building at his Detroit plant. To provide for this immense expansion, Congress has made appropriations so gigantic that, with those now pending, the total will equal the entire amount expended on the navy from its birth in 1794 up to 1916.

These are but the barest facts, the mere outlines of a year of distinguished achievement, but they suffice to show why the American Navy has won anew the hearts of our nation. They are enough to explain these ringing words in the *New York Times*: "There has not been a reflection on the sea service since the state of war with Germany was declared, not even a suspicion of incompetence." Secretary Daniels said in his annual report: "Our navy has been called on to do much more than the public realizes, and in no case and in no way has it so far been found wanting either in matériel or personnel." These statements of fact show the power of a democracy to turn itself quickly to any necessary task, they show the effectiveness of the organization of the navy, and the ability of its Secretary, Mr. Daniels.—*Literary Digest*, 14/3.

GOVERNMENT POWDER PLANTS.—The navy is building two smokeless powder manufacturing plants of approximately \$50,000,000 each, one at Nashville, Tenn., and the other at Charleston, W. Va., each capable of making 500,000 pounds of powder per day. The latter plant is to be constructed by the government, and the work already is under way. The Secretary of War has finally decided to take advantage of the valuable knowledge of those in charge of the Du Pont powder plant, and officials of the company will erect the plant at Nashville. The company will contribute its secret processes of manufacture and receive a flat payment of \$500,000 and a further commission of 3 per cent of the total cost, the total fee not to exceed \$2,000,000. The Du Pont people will operate the plant for at least six months and, during operation, will receive 3½ cents per pound for all powder manufactured, with a bonus for reduction in cost of production. It is announced that the plants will be in operation in August of this year. On January 10, Secretary Baker told the Senate committee on military affairs that the Du Pont people had offered to construct the government powder factory last October, but he objected to the high cost of supervision, although the final offer of the company was to go ahead with the work and leave the question of remuneration to arrangement.—*Army and Navy Register*, 2/3.

POLICY.

COMMAND OF U. S. DESTROYER FORCE ABROAD.—Contrary to the almost universal supposition in this country, the American destroyers operating in British waters are not under the immediate command of an American naval officer, but under an officer of the British Navy, Admiral Sir Lewis Bayly, K. C. B., C. V. O., the local commander of the section where the destroyers make their headquarters.

While Vice Admiral William S. Sims has jurisdiction over all American warships operating in European waters, including those engaged in combating the enemy submarines, he and his staff are located in London, where he performs duties more in the nature of a representative of the chief of naval operations at our Navy Department.

Navy officers here are much dissatisfied and, to some extent, humiliated because an American naval officer has not been placed in immediate command of the destroyers abroad. At first the number of our destroyers there operating was small, and it was logical that they should work under the British destroyer organization. Now that our fleet of this and other small classes there has reached considerable proportions and includes some of our latest and best destroyers, our navy officers here feel that the time has arrived when the fleet should be operated under an American naval officer of flag rank. However, the condition has developed not so much as a result of intention on the part of the British authorities as from inaction on the part of our Navy Department in failing to initiate proceedings that would lead to a change. Doubtlessly the matter will be taken up sooner or later and one of our flag officers assigned to duty as immediate commander of the American destroyers in British waters.—*Washington Post*, 17/3.

CONTROL OF FOREIGN COMMERCE TO CONSERVE SHIPPING.—The President's order putting all our foreign commerce under control by license will be only another evidence both to our enemies and ourselves that we are showing a progressive willingness to go the limit for the successful prosecution of the war. Our military and naval preparations, our huge bond issues, our loans to our allies, the very general conscription of industry, the nationalization of the railroads, our individual and collective eagerness to save food for the benefit of England, France, and Italy, all prove how deeply we are committed to the conflict against German autocracy. This last step taken by the President is only the logical development of the concentration of all our forces in winning the war. Commerce not essential to this purpose, which uses tonnage necessary for transportation of troops, munitions, and food across the Atlantic, will simply not be licensed by the President. Our allies have long ago adopted this latest plan. Gradually a parity of war conditions is being established among all the Allies.—*Nautical Gazette*, 21/2.

U. S. COMPETING FOR SEA SUPREMACY.—London *Fairplay* is very apprehensive of British shipping supremacy, due to the U. S. emergency fleet, which, when off the ways, will consist of an enormous mass of tonnage, all of the tramp type, that is an undoubted menace to the old time idea that Great Britain is mistress of the seas, as this will mean that the United States will be in the position of becoming a formidable competitor. The writer in *Fairplay* says: "If pre-war conditions are allowed to prevail, not only will American cargo vessels be able to shift from, say, San Francisco to New York with cargo—whereas British vessels will only be allowed to go in ballast—but they will also be able to trade between British ports on absolutely equal terms with British craft. To the extent shown, American tonnage therefore will, after the war—if things continue as they were—be in a distinctly more favorable position commercially than British.—*Marine Journal*, 9/3.

RULING MADE TO INSURE THAT ALL SHIPS BUILT IN U. S. YARDS SHALL FLY THE AMERICAN FLAG.—Action has been taken by the war trade board, in cooperation with the United States Shipping Board, to insure that all vessels turned out under the shipbuilding program, or otherwise, shall be registered as American vessels and thereby kept under the control of the United States Government.

In order to effect this, a ruling has been adopted by the war trade board, which will be incorporated as Paragraph VI in General Rules No. 1, Governing the Granting of Licenses for Bunker Fuel, Port, Sea, and Ship's Stores and Supplies, and which reads as follows:

"No application for bunkers by any vessel built in the United States and completed after February 1, 1918, shall be granted, unless the vessel is documented under the American flag or unless the United States Shipping Board shall have waived such documentation."

Clause (o) of Paragraph V of the General Rules No. 1 above referred to, as amended February 5, 1918, provides that no neutral or uncommandeered American vessel shall be bought or sold without the previous approval of the United States Shipping Board, the war trade board, or the interallied chartering executive.

In the application of this clause (o) the war trade board has issued the following announcement of the principles which will guide their action in the administration of this paragraph, which is to the following effect:

"That applications for permission to buy or sell the vessels mentioned in clause (o) of Paragraph V should be made in the first instance to the United States Shipping Board, and that the war trade board would be governed by the decision of the United States Shipping Board upon such application."

For the further guidance of applicants for permission to buy or sell vessels under Section (o), the following rules of the shipping board have been issued:

Applications to the shipping board for permission to buy or sell vessels under Section (o) of Paragraph V of the war trade board's General Rules No. 1 should include the following information:

1. Name of vessel.
2. Official number.
3. Date of construction.
4. Type of vessel.
5. Gross tonnage.
6. Deadweight capacity.
7. Speed.
8. Name of purchaser.

—Official Bulletin, 23/2.

THE NAVY AND SHIPPING CONTROL.—For the purpose of establishing liaison between the navy and the shipping-control committee at the port of New York and such other ports as may be necessary, a naval officer representing the overseas operating division of the bureau of operations, Navy Department, will be assigned to that office. All matters relating to naval personnel operating cargo or other vessels will be handled directly with the representative of the overseas bureau of operations, Navy Department. On all matters pertaining to troop convoys, or in connection with matters which arise between the army and navy in the operation of troop ships, liaison will be established through the naval aids on the staffs of the commanding general, port of embarkation, and the details necessary in these operations will be handled directly between the commanding generals of the several ports of embarkation and the commander of the cruiser force. The executive office of the shipping-control committee will be established at 45 Broadway, and in order to expedite the transaction of government business all personnel assigned directly to the performance of the duties of the shipping-control committee will be located in the same building or buildings adjacent thereto. Offices at other ports of embarkation will be selected and determined upon by representatives of the shipping-control committee and the commanding generals or depot quartermasters of expeditionary depots at the several ports.—*Army and Navy Register*, 9/3.

PERSONNEL

NAVAL PERSONNEL INCREASE.—If the naval appropriation bill, so far as it pertains to naval personnel, is enacted as drafted by the House Naval Committee, the authorized enlisted strength of the navy will be raised to 228,000 men from the present combined permanent and temporary strength of 150,000, as recommended by the chief of the Bureau of Navigation.

The bill as drafted also contains some other legislation affecting the personnel. It is provided, among other things, that the naval militia be transferred to the naval reserve force, thus simplifying matters by having one class of temporary personnel.

The bill also places the chief of naval operations on the same basis as to pay and allowances as the chief of staff of the army, with whom he has the same relative rank and corresponding duties. This change was recommended to the committee, because it was not seen why the chief of naval operations should be discriminated against in the matter of pay and allowances.

The bill contains a clause, recommended from sources in the Navy Department, providing that the chief of the department bureaus and the judge advocate general of the navy shall have the rank, pay and allowances of rear admirals of the upper half, and thus placing them on the same basis as the War Department bureau chiefs. The judge advocate general now has the rank of captain, and some of the bureau chiefs the rank of rear admirals of the lower half, corresponding as to pay and allowances to those of brigadier generals in the army, while others already have the rank, etc., of rear admirals of the upper half.

It is understood that the recommendation that those holding temporarily the ranks of admiral and vice admiral by virtue of special assignments, as, for example, chief of naval operations, commanders-in-chief of fleets, and second in command, shall have the higher rank, but the pay of rear admirals, when placed on the retired list, was not embodied by the committee in the bill. Under the present law those holding the higher rank return to the grade of rear admirals.—*Washington Post*, 17/3.

INCREASE OF MARINE CORPS.—As drafted by the House Naval Committee, the naval appropriation bill, which is nearing completion in that committee, authorizes a further temporary increase of the marine corps by 20,000 men, making the total combined temporary and permanent allowance 50,000 men.

This increase will not be sufficient to enable the corps to raise its present representation of a brigade in France to a complete division, including the special troops such a tactical unit requires, as the minimum estimates to enable that to be done are for a marine corps of 71,344 men.

Naturally, the marines are disappointed that provision is not made for the larger number, and it is understood that some members of the committee are in favor of a greater increase and will seek to have it inserted in the bill on the floor of the House. It is uncertain, of course, whether this will be done, but the sentiment in Congress is so favorable to the marine corps that it is practically certain that at least the increase of 20,000 men recommended by a majority of the House committee will be authorized.

As the marines are employed largely in comparatively small detachments, it was not thought necessary to provide for the temporary force the same proportion of officers of the higher grades as allowed for the permanent personnel. Therefore, the law that restricts temporary appointments based on temporary strength to the grades of major and below was not repealed, but appointment of some additional officers of higher grades was allowed, in order that they might be available for the organization of additional regiments and higher units. This allowance is one additional permanent major general, and as temporary officers three brigadier generals, 12 colonels and 12 lieutenant colonels, in addition to the numbers now allowed those grades.—*Washington Post*, 17/3.

NAVY'S COMPLEMENT FILLED.—The enlisted strength of the regular navy still remains filled, and it has been necessary to continue a limited quota of enlistments to 1000 a week throughout the country. This restriction was imposed upon the navy recruiting service early in January, when the maximum strength was reached. There are approximately 192,000 men in the regular service and about 79,000 men enrolled in enlisted ratings of the naval reserve force, which branch, however, has no limit of strength fixed by law. The transfer of recruits from their homes has been resumed, and men are sent to the eastern rendezvous in lots of 400 and 500 at a time. The training stations are still well filled, but are not overcrowded.—*Army and Navy Register*, 16/3.

TRAINING NAVAL RESERVE.—Steady increases of the various classes comprising the naval reserve force have rendered necessary additional facilities for training the personnel. In furtherance of the plan of the naval officials to enroll undergraduate students of technical universities, as described recently in these columns, steps have been taken to establish a course of instruction for junior engineer officers at Stevens Institute, Hoboken, N. J. This course will specialize in steam engineering, as distinguished from the training in gas engines which has been conducted at Columbia University, New York City, for engineers of motor-boats. As the requirements are much greater for junior engineer officers in steam vessels, the class will consequently be more extensive. Gasoline-driven craft being smaller, only a limited number of engineer officers was needed, and the demand was readily met. It is the policy, for the present at least, not to interfere with

the completion of the college course of technical students who enroll in the naval reserve force, but to permit them to continue at school or university until they graduate. The training camp and school at Pelham Bay has already developed into a small city, under the supervision of Commander W. B. Franklin, N. R. F., and plans have been prepared for the further enlargement of the school to a capacity of 16,000 reservists. These men will comprise the personnel for manning the merchant vessels as they are brought under the navy. The training school is divided into two parts—the instruction of recruits in seaman and petty officer ratings in the naval reserve and the selection and the preliminary instruction of young men as officer material—for a further course either at the officers' training school or at the reserve school at the Naval Academy, Annapolis. A still further camp is under construction at Detroit, Mich., for the accommodation of some 5000 reservists who will constitute the crews for the Ford motor-boats as they are built. This camp will be more in the nature of a receiving station for men selected to man these boats, although there will be a special course of training for the engineers' force, enabling the men to become familiar with the mechanism while the vessels are under construction.—*Army and Navy Register*, 2/3.

OFFICERS FOR NAVAL RESERVE.—An "Officers' Material School" for the naval auxiliary reserve has been established at the naval training camp, Pelham Bay, New York City, which at present is graduating deck officers at the rate of 100 to 150 a month for service in auxiliary naval vessels. It is intended to increase the output of this school to 200 a month, and to carry out this purpose the naval districts first to fifteenth, inclusive (along the North Atlantic coast), have been directed to transfer a weekly quota of men aggregating 25 each week beginning on March 12, to the superintendent of the auxiliary naval reserve, Municipal Ferry Terminal, New York City. These men will be assigned by the superintendent to such coastwise vessels as are available, and if their work on those vessels proves satisfactory at the end of two months' sea training, they will then be ordered to the officers' material school at Pelham Bay Park. Those who are found unsatisfactory will be given suitable ratings and transferred to the training camp at Pelham for general detail. The candidates must be men of ability and officer material, between 21 and 30, with education equivalent to a completed high-school course, physically qualified according to regular navy standards, and shall have had at least one month's military training or its equivalent. They may belong to the regular navy, national naval volunteers, or any class of the naval reserve force enrolled for general service. A similar school will be maintained at Municipal Pier, Chicago, under the commandant, ninth naval district, for the preparation of men for the officers' material school at Pelham. A similar school, for the training of engineer officers for the naval auxiliary reserve, will be established for the purpose of graduating 100 officers for steam engineering duties each month, beginning August 1. The training course will be four months in length, the first month being spent at Stevens Institute, Hoboken, where the preliminary instruction in boilers, engines, and auxiliaries will be given; two months' practical work will follow on coastwise ships, sound and river steamers, tugs, ferries, and at the different repair plants in the vicinity of New York. The fourth month will be spent in final training in organization, routine, care and upkeep, repairs, and the duties of engineer officers at Stevens Institute. A quota of 25 men each week has been allotted, beginning March 27. Candidates for this course must have the same general qualifications as those fixed for deck officers.—*Army and Navy Register*, 9/3.

TWENTY-THREE NEW VESSELS OUTPUT FOR MARCH.—The United States Shipping Board has made public the following:

Fifteen steel vessels, aggregating 114,100 tons, were completed and delivered in American shipyards in February for the Emergency Fleet Corporation. It is expected that in March the total number will be increased to 23 vessels, of an aggregate tonnage of 188,275.

Some of the ships included in the March schedule already have been completed.

The following table shows the February record of vessels completed and delivered:

Description	Tonnage	Date of completion
Cargo vessel	8,800	Feb. 12
Do.	8,800	Feb. 4
Do.	9,400	Feb. 4
Do.	8,800	Feb. 4
Do.	10,000	Feb. 3
Do.	6,000	Feb. 6
Tanker	14,900	Feb. 14
Collier	8,600	Feb. 15
Cargo vessel	8,800	Feb. 22
Do.	8,800	Feb. 26
Do.	8,800	Feb. 16
Do.	3,100	Feb. 14
Do.	3,100	Feb. 14
Do.	3,100	Feb. 25
Do.	3,100	Feb. 27
Total	114,100	

The estimated deliveries for March are shown in the following table:

Description	Tonnage	Date of completion
Tanker ¹	10,475	Feb. 28
Cargo vessel	8,800	Mar. 4
Do.	3,300	Mar. 6
Do.	4,500	Mar. 1
Do.	7,500	Mar. 1
Tanker	7,000	Mar. 7
Do.	10,475	Mar. 4
Cargo vessel	8,800	Mar. 9
Do.	7,500	Mar. 10
Do.	6,200	Mar. 11
Tanker	12,650	Mar. 15
Cargo vessel	8,800	Mar. 15
Collier	8,600	Mar. 15
Tanker	10,300	Mar. 15
Cargo vessel	8,800	Mar. 15
Do.	8,800	Mar. 17
Collier	4,900	Mar. 20
Cargo vessel	10,500	Mar. 25
Do.	3,300	Mar. 25
Tanker	9,000	Mar. 27
Cargo vessel	8,800	Mar. 30
Do.	8,800	Mar. 30
Tanker	10,475	Mar. 31
Total	188,275	

¹ Accepted March 1.

U. S. MERCHANT MARINE

NUMBER, TYPE AND TONNAGE OF VESSELS REQUISITIONED OR UNDER CONTRACT FOR UNITED STATES SHIPPING BOARD.—The United States Shipping Board authorizes publication of the following table showing the number, type, and tonnage of the vessels which have been requisitioned or are under contract for construction :

Number, type, and deadweight tonnage of vessels under contract or requisitioned by the Emergency Fleet Corporation, segregated as to wood, steel, composite, and concrete.

Vessels under contract													Type of vessels				Vessels under requisition			
Total				Wood		Steel		Composite		Concrete										
Type of vessels	No. of ves- sels	Dead- weight tonnage	No. of ves- sels	Dead- weight tonnage	No. of ves- sels	Dead- weight tonnage	No. of ves- sels	Dead- weight tonnage	No. of ves- sels	Dead- weight tonnage	No. of ves- sels	Dead- weight tonnage	No. of ves- sels	Dead- weight tonnage	Total	No. of ves- sels	Dead- weight tonnage	No. of ves- sels	Dead- weight tonnage	
Cargo:	2,500.....	1	2,500																	
	3,000.....	1	3,000																	
	3,500.....	457	1,599,500	381	1,333,500	24	84,000	50	175,000		1	3,000						3	14,700	
	4,000 and under	37	147,650	29	115,650			8	32,000		2	7,000						4	34,400	
	4,500 and under	6	27,000	6	27,000															
	4,700.....	12	56,400	12	56,400															
	5,000 and under	220	1,022,700			220	1,022,700											7	49,100	
	6,000 and under	13	74,100			13	74,100													
	7,500 and under	76	569,600			76	569,600													
	8,800 and under	98	862,400			98	862,400											4	18,972	
	9,000.....	80	720,000			80	720,000											2	10,600	
	10,000.....																			
	12,000 and under	86	814,800			86	814,800											6	29,572	
	12,000 and under	16	170,900			16	171,900													
	Total.....	1,103	6,070,550	429	1,535,050	613	4,318,500	58	207,000	3	10,000							2	8,900	
Cargo and trans- ports:																	7	49,300		
																	3	24,880		
																	7	63,000		
																	12	115,400		
																	15	161,295		
Total.....	75	610,000			75	610,000											47	435,425	47	435,495

7,500.....	3	22,500	.....	3	22,500	.....	.....	.....	3,500 and under	82	267,280	82	267,280
10,000 and under	9	87,300	.....	9	87,300	.....	.....	.....	5,000 and under	35	155,100	35	155,100
10,100.....	15	151,500	.....	15	151,500	.....	.....	.....	6,000 and under	2	11,000	2	11,000
Total.....	27	261,300	.....	27	261,300	.....	.....	.....	7,500 and under	29	212,500	29	212,500
Tug boats.....	20	.....	.....	6	.....	.....	.....	.....	8,000 and under	2	16,000	2	16,000
Grand total..	1,225	6,941,850	.....	721	5,189,800	58	207,000	3	10,000	.....	.....	.....	.....
									9,000 and under	14	126,000	14	126,000
									10,000 and under	19	184,840	19	184,840
									12,500 and under	24	286,450	24	286,450
									15,001 and under	2	28,000	2	28,000
									Total.....	257	1,707,370	257	1,707,370
									Refrigerators:				
									7,500 and under	12	77,700	12	77,700
									10,000 and under	1	10,000	1	10,000
									Total.....	13	87,700	13	87,700
									Transports:				
									5,000 and under	2	9,000	2	9,000
									Grand total ...	332	2,318,167	332	2,318,167

Requisitioned vessels completed and accepted or reconveyed

Type of vessels	Num- ber of vessels	Dead- weight tonnage	Type of vessels	Num- ber of vessels	Dead- weight tonnage
Colliers:			Tankers—Continued:		
8,600 tons.....	1	8,600	10,475 tons and under....	4	41,725
12,650 tons.....	1	12,650	14,900 tons and under....	5	72,150
Total.....	2	21,250	Total.....	14	153,505
Ore carriers:			Cargo:		
6,000 tons.....	1	6,000	3,500 tons and under....	26	82,520
11,300 tons.....	4	45,200	4,500 tons and under....	7	28,700
17,600 tons.....	1	17,000	6,000 tons and under....	4	22,500
Total.....	6	68,260	7,500 tons and under....	8	57,960
Passenger and cargo:			8,800 tons and under....	14	123,200
4,986 tons.....	1	4,986	10,000 tons and under....	7	67,860
Tankers:			12,500 tons.....	3	37,500
8,000 tons.....	1	4,000	13,000 tons.....	1	13,000
8,500 tons.....	2	16,630	Total.....	70	433,240
9,000 tons.....	2	18,000	Grand total.....	93	681,241

Vessels contracted for and requisitioned

Character of Vessels	Num- ber of vessels	Total dead- weight capacity
Wood.....	443	1,535,050
Steel.....	1,723	5,207,400
Composite.....	58	207,000
Concrete.....	3	10,000
Total contracted.....	1,227	6,959,450
Total requisitioned (all steel)	2,425	2,999,408
Grand total.....	1,652	9,958,858

¹ This total includes 2 vessels of 8,800 tons each, completed and accepted.

² This total includes 93 vessels of 681,241 tons which have been completed and accepted or reconveyed to original owner.

Prepared by the statistical department in the executive and administrative division.
MARCH 12, 1918.

RODMAN'S NECK TRAINING STATION.—On Rodman's Neck, which juts out into what is known as Eastchester Bay, near City Island, there is a naval city concerning which persons in New York know little, despite the fact that it is within the city limits and that it is to-day one of the best equipped naval training plants in the United States, where more than 5000 boys, most of them from colleges and universities, are undergoing intensive training for service on the submarine chasers which are destined to play a big part in fighting the German submarines. The naval cantonment where these boys, who come from every state in the Union, are being whipped into shape to play their part in the war, is officially known as the Naval Reserve Training Station of the United States, and so great has been the success of the experiment that the Navy Department has decided to triple its capacity, so as to make possible the accommodation of 16,000 men. Work of enlarging the plant will be immediately started.

A little more than six months ago Rodman's Neck was an uninhabited tract of land, part of it wooded and part of it sandy beach. Its only use was as a picnic ground for New York school children and a camping site for the week-end fisherman. To-day it is a compact, well-ordered, healthy little city of more than 6000 people, most of them boys between the ages of 19 and 21 years of age. The man who commands the city is Commander W. B. Franklin, U. S. N., through whose courtesy a *Times* reporter was permitted yesterday to inspect the station.—*N. Y. Times*, 24/2.

MISCELLANEOUS

SIX INJURED IN EXPLOSION ON BOARD THE "MONTANA."—One man was fatally injured, two seriously and five slightly hurt in the explosion of a cartridge case on board the armored cruiser *Montana*, the Navy Department announced. Boatswain Mate Charles W. Pauly, No. 221 West Thirty-third Place, Chicago, Ill., died while being taken to a hospital.

Seamen Roy L. Putnam, Phoenix, Ala., and Lawrence H. Finley, Cawker City, Kan., were seriously hurt.

The slightly injured were: Private Richard H. Guion, Marine Corps, New Orleans, La.; Seamen William T. Friederichs, Chippewa Falls, Wis.; Charles E. Pyle, Lamar, Col.; John H. Atterson, Salmons, Ky., and H. T. Leroy, home address not given. No details of the explosion were announced.—*N. Y. Herald*, 21/2.

EIGHT HURT BY ACCIDENT ABOARD CRUISER "MONTANA."—Eight men have been injured in an explosion of a cartridge case during target practice on the cruiser *Montana*.

A brief report to the Navy Department carried no details of the accident and did not give the names of the men hurt.

Official denial was issued by the department of recent reports of an explosion on board the battleship *Utah*. The death of Lieut. Commander Baush, which gave rise to the rumor, was caused by falling down a coal hatch.—*Washington Evening Star*, 19/2.

U. S. ARMY

THE NEXT DRAFT.—[From the office of the Provost Marshal General.] There has been a great deal of speculation in the press concerning what has been termed "the date of the next draft." Almost every week, announcements have been made, and these announcements, being mere guesses, have resulted in an unrest and uncertainty that has been unfortunate.

As a matter of fact the state of preparedness of the army to assimilate recruits varies from day to day and from week to week, and the most scientific manner of recruiting the forces will be to withdraw them from civil life as fast as they can be assimilated by the army, and no faster.

According to this plan, men will be inducted into the service in very small groups apportioned among the various states from week to week or from month to month as they are needed. In order to distribute the burden equally over the various states, however, it is necessary to make arithmetical computations of the share of each state, and it is not practicable to make these computations for such small numbers. For mere bookkeeping facility, therefore, it is necessary to assume a total of considerable size, and to apportion it among the several states as their immediate burden. This total is called a national quota, and the various shares are called state quotas. The announcement of the quota does not mean that any such great number of men will be called to military service at once, and, indeed, has no necessary relation to the date of call for the reason that a constantly changing situation causes changes in the number of men who are to be called to the colors.

It is unwise to attempt to make a forecast of the number of men that will be called for immediate military service in advance of the development of the whole complex problem of supply and transportation. It is also unwise to make public announcements of specific figures which might serve the enemy as a precise basis for determining the plans for military participation of the nation in this war. It is necessary, however, to compose the present unrest and uncertainty by some public announcement, and for this reason the following is authoritatively stated:

The next national quota will be announced and apportioned among the several states as soon as pending legislation authorizing a change in the basis of computation is enacted by Congress. This legislation has been passed by the Senate and favorably reported by the House Military Committee. The number that will be assumed as a basis for computation will be 800,000, which is well within the authorization of Clause 4 of Section 1 of the Selective Service Act of a second increment of 500,000 men, increased by the recruit training units authorized by Clause 5 of said Section 1, and by the special and technical troops authorized by Section 2 of said act. It cannot now be announced what the total number to be called to the colors each month will be, but it is stated that no more men will be called than can be properly accommodated and promptly assimilated.—*Army and Navy Register*, 16/3.

THE ARMY IN FRANCE.—In support of his statement that the prospects were not unfavorable for putting 1,500,000 American soldiers in Europe this year, Secretary of War Baker submitted certain confidential tonnage figures to the Senate Committee on Military Affairs. According to his data, 2 tons gross or 1.6 tons net of shipping per man are needed to maintain our army on the other side. The War Department also estimates that an army in the field requires 50 pounds a day a man of supplies of all kinds, including food, clothing, and munitions, which many authorities consider entirely too low. On the 50 pounds a day basis, however, it would take more than 9 tons of supplies a man per year, or an aggregate of 13,500,000 tons of supplies, to maintain an army of 1,500,000 men for one year in France. If all vessels could be loaded to capacity, and the number of round trips which they could make to Europe in a given time were known, it would be an easy matter to calculate how much shipping would be required to keep 1,500,000 American soldiers properly supplied in Europe. But it is a matter of record that ships transporting supplies to France are only carrying part of their maximum tonnage capacity because the supplies sent over are of such a nature that they cannot be often packed closely enough to load a vessel to its full carrying capacity. Then again, all sorts of delays are incurred in the making of a round trip. The amount of tonnage required to supply a given number of troops in Europe cannot under present conditions, therefore, be estimated with any degree of accuracy. As American tonnage now available is only 1,400,000 tons, existing shipping facilities are clearly inadequate to maintain 1,500,000 soldiers. Secretary Baker is counting on securing

more allied vessels, and his getting 1,500,000 men to Europe this year will depend largely on the amount of tonnage placed at his disposal by our European allies.—*Nautical Gazette*, 21/2.

TO SPEND \$300,000,000 ON CONSTRUCTION WORK.—Approximately \$300,000,000 worth of construction will be done for the War Department this year under the direction of the emergency construction division of the war industries board.

The program this year calls for the building of six great terminal and storage areas at Atlantic coast ports, approximately 31 interior or accumulation storage areas, and perhaps six gas and powder plants in addition to the two big powder factories already authorized at Nashville, Tenn., and Charleston, W. Va.

All the contracts have been made under the cost and percentage arrangement, with close supervision by government experts.

The old maximum of 10 per cent profit on contracts running up to \$100,000 has been replaced by 7 per cent in the new contracts, which follow a finely graded scale of $6\frac{1}{2}$ per cent between \$100,000 and \$500,000, 6 per cent between \$500,000 and \$1,000,000 to the minimum of $2\frac{1}{2}$ per cent on contracts of \$10,000,000. The old contracts allowed 8 per cent between \$100,000 and \$250,000 and then 7 per cent up to \$3,000,000.

As the bulk of the contracts called for expenditures varying from \$1,500,000 to \$3,000,000, the board decided that the graduations of the old percentages were not adjusted equitably.

Both forms of contracts set a maximum of \$250,000 profit on any one contract. The new contracts limit profit on subcontracts to $2\frac{1}{2}$ per cent, regardless of the rate paid on the body of the work.—*Washington Evening Star*, 13/3.

FIVE HUNDRED THOUSAND TROOPS IN FIRST ARMY ON AMERICAN FRONT.—*Force to be Completed at Once for Three Corps of Six Divisions Each.*—Based upon the three line method of trench warfare evolved in France, the War Department, it was learned, has approved a system of organization which fixes six divisions as the strength of an army corps.

Three or more corps will constitute a field army and the immediate purpose of the department is to complete the organization of the first field army in France in the shortest possible time to give General Pershing the strength to hold a fully "Americanized" sector of the front. The scheme leaves to General Pershing the determination of the number of corps and the number of field armies needed, and also authorizes him to recommend commanders for the higher units.

By the six division army corps system each corps will occupy a front sector with two divisions, while two replacement or reinforcement lines of two divisions each will back them up. The effect is to produce the line of depth necessary for the type of warfare now in progress.

Only Seasoned Men in First Line.—Replacement troops sent from the United States are fed into the war machine in France at the third line. They move forward in regular order as their training progresses and arrive at front line trenches to fill in casualty gaps only when they have been thoroughly seasoned.

To fulfill the functions of an army corps it has been found necessary to place under a corps commander, in addition to his six infantry divisions, approximately 30,000 men, known as corps troops. These comprise artillery units, engineers and all types of service battalions for work on the communication lines of their own corps. A similar organization of about 130,000 men is necessary for each field army of three corps. These field army troops maintain the lines from the advance base of the army back to the sources of supply. In the case of General Pershing's forces this line connects with the ocean transport service.

Included in the corps troops are many units of heavy artillery equipped with guns ranging up to 10 and 12 inches in caliber, both for fixed emplacement and for mobile artillery. This comprises the artillery reserve of the corps. The great general artillery reserve of the field army is under direct command of the army commander and included in his so-called army troops.

Artillery of All Calibers.—The organization schedules show that General Pershing is to be equipped eventually with artillery of all calibers on a scale not heretofore dreamed of. The proportion of artillery to army rifles adopted by the War Department is greater than that of either the British or French armies and the tendency of the department is to increase the big guns.

Included in the heavy artillery assigned to corps or field army commanders will be whole brigades of anti-aircraft guns, mobile howitzers of 6-, 8-, 10- and even 11-inch caliber, rifles of similar size, including heavy long-range naval guns, and probably, as soon as they are available, batteries of the monster American 16-inch naval rifles recently developed. With this array of guns enemy depots 20 miles or more in the rear of his trenches could be kept under bombardment.—*N. Y. Herald*, 8/3.

ORDNANCE AND GUNNERY

PRELIMINARY FACTS CONCERNING THE BROWNING GUNS.—The curtain of secrecy has at last been raised, revealing to an anxious audience the light and heavy Browning guns. The occasion was the official demonstration on February 27 at Congress Hill, a few miles out of Washington, D. C., in the presence of members of Congress, army representatives, foreign military attachés and 50 or more reporters.

So the light-weight Browning gun and the heavy-duty Browning machine gun are no longer a mystery. The former is practically a rifle, an automatic rifle weighing 15 pounds, while the latter is a machine gun very much along the lines of the Maxim in appearance, weighing but 34½ pounds. Both guns handle the same ammunition that the American forces in France will use in their Springfields and modified Enfields, namely, the rimless .30 caliber, cupro-nickel jacketed cartridge, which develops a pressure of 50,000 pounds to the square inch at the moment of discharge. Thus the ammunition will be interchangeable between all four weapons, which is an important consideration at the battle front.

Taking up first the light Browning gun, this weapon may be described as a rifle with automatic and semi-automatic action. That is to say, it can be employed for continuous fire, emptying its entire magazine in rapid order at the command of the trigger, or it can be employed as a self-loading and self-cocking rifle, in which case the rifleman pulls the trigger for each shot. In tests the gun has discharged its 20 rounds in 2½ seconds.

The Browning light gun or machine rifle, as it is designated by the army officials, is of the air-cooled, gas-operated design. It may be fired from the shoulder, the rifleman finding his target over sights identical with those used on the new United States rifle, model of 1917, or from the hip, the rifleman finding his target by his general sense of direction, the latter being a knack quickly acquired through practice.

The principle of gas operation is simple. The gun is cocked with an easily operated handle for the first shot. The bullet is expelled by gases, which, as already stated, exert a maximum pressure of 50,000 pounds to the square inch. A small portion of this powder gas is taken off by the gun mechanism to act as power to operate the gun automatically. A bullet discharged from this gun has approximately the same energy as that fired from the United States rifle, model of 1917, or from the Springfield service rifle. Cartridges are fed from a detachable magazine containing 20, or for special purposes 40, service cartridges. The magazines may be detached by merely

pressing a button and a new magazine attached by one motion, this changing operation requiring about two and a half seconds.

The gun may be operated as an automatic or as a semi-automatic arm by the manipulation of a conveniently located lever. By putting the lever in the first position, the gun is made to fire single shots by trigger release; by putting the lever in the second position the gun becomes an automatic and will fire 20 shots in from two and a half to three seconds; the third lever position is the "safe" or locking device. It is said by the military authorities that the designer intended the gun to be used more as a semi-automatic than as an automatic arm.

Powder gases create terrific heat, sometimes developing the destructive temperature of 4000 degrees Fahrenheit. An air-cooled automatic gun, therefore, has its limitations. The Browning rifle has an open and very simple construction and cools remarkably quickly. The rifleman may fire 350 continuous shots from it without having to stop and cool the weapon.

The chief characteristic of the gun is its extreme simplicity of construction, rendering the manufacturing problem correspondingly simple. It has fewer than 20 principal parts and possesses the great advantage of standardization, being easily and quickly taken apart and reassembled by the ordinary soldier. From the manufacturing viewpoint, the gun possesses the great advantage that it may be promptly produced in large and increasing volume as shop machinery is multiplied and operating personnel developed.

Used cartridges are ejected from the side of the gun, never crossing the sight of the rifleman, and coming out with sufficient force to clear themselves beyond his notice. A feature of the rifle is that the cocking handle remains stationary when the gun is in operation and is so arranged that it will in no way hamper the gunner, thus eliminating a danger common to many guns.

The gunner may operate the gun at all times without aid. Only one tool, a small wrench, is needed to care for the gun, as most of the operations of taking it down and reassembling may be performed by use of a cartridge as a tool.

As the gun is intended for the use of charging infantry, the problem of ammunition is naturally an important one. In this connection we are told that the gunner carries approximately 120 rounds of ammunition in his belt or bandolier, and his two assistants carry 400 and 240 rounds, respectively, loaded in magazines. The loaded magazine weighs 1 pound 7 ounces. Thus it is possible for a gunner to go into battle with a supply of about 800 rounds of ammunition.

Equally interesting is the heavy Browning gun, which is of the water-cooled, belt-feed design, and is operated by means of the power created by the recoil action. It is fed from a cotton belt which contains 250 rounds of service cartridges. The belts may be rapidly loaded by means of a machine which is a development of the one which Mr. Browning devised some 20 years ago in connection with the Colt gun.

Like the light gun, the heavy-duty Browning piece is marked for its simplicity of construction, rendering manufacturing problems easy and giving it a high degree of endurance. In the government test 20,000 rounds were fired from this gun with only three stoppages, one being due to a defective cartridge. In a further test firing was continued with the same gun to 39,500 shots, when the gear gave way. A duplicate gun fired 20,000 shots in 48 minutes 16 seconds without a malfunction, and with only three stoppages, these being due to defective cartridges.

The light-weight but sturdy tripod of the Browning heavy gun permits the ready laying of the gun on its target. The cartridge belt is held in a wooden box fastening on the left side of the gun, as in the case of the Colt machine gun; this and the pistol grip of the new gun are reminders of the earlier gun of Mr. Browning's conception. This same gun, with certain modifications including the stripping of its water-jacket, weighs but 22½ pounds and should prove satisfactory for aviation service.



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A FORMIDABLE FIGHTING BATTLEMENT.
From Underwood & Underwood, N. Y.

A 14-inch turret barrette on board the U. S. S. *Pennsylvania*, flagship of the Atlantic Fleet.

It is still too early to pass judgment on the workability of the weapons under actual battle conditions. But as far as convincing tests are concerned, the guns have produced a most favorable impression. Furthermore, their design reflects the years of experience of the inventor in firearms of all kinds. As a quantity-production problem, moreover, both guns are ideal in every respect, permitting the maximum employment of automatic machinery, interchangeable parts, rapid assembly, and all those other features which go to make tremendous production possible.—*Scientific American*, 9/3.

U. S. TYPE GAS MASK RATED BEST IN USE.—"Gassing" of American soldiers in France, such as occurred during a bombardment of an American sector, will be attended by fewer deaths and less distressing and agonizing after effects as soon as the American troops become proficient in the speedy adjustment of gas masks provided for them, according to officials of the gas defence service of the medical department of the army. These masks were designed by the United States gas defence service.

The gas mask, which was thoroughly tested on this side before it was adopted, is said by experts of the American and allied armies to be the best device of its kind yet found. This mask is now being manufactured in quantities for shipment abroad, and it is stated that within a very short time every soldier in the trenches occupied by our troops will be provided with one.

The first work toward the establishment of an American gas defence service was under the supervision of the bureau of mines, which had the personnel and equipment to carry on experimental work. In July, 1917, a special department to carry on this work was established. Following the example of the English, the department was incorporated into the medical department of the army.

The defence service is divided into three separate parts: (1), field supply section; (2), field training section; (3), overseas repair section.

The function of the field supply section is to manufacture or procure all gas defence materials and equipment. The big work, of course, is to furnish our troops with effective masks. The small box respirator type of mask, admittedly the best mask in existence, was accepted as a model.

With no actual experience to depend upon, much experimental and research work was necessary. An extensive organization was built up, with branches in several cities. Recently it was decided to establish a government-operated plant to handle the final assembling and the difficult sewing operations on the face piece. This plant will soon be in full operation, with about 4000 employees.

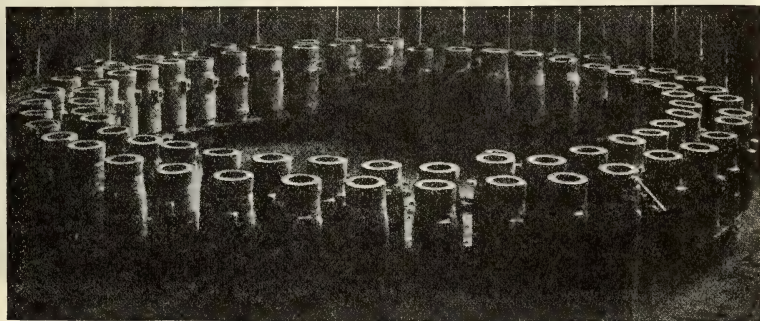
The gas defence schools at all camps provide training in the theory and practice of gas defence. As in all other elements of warfare the principles of defence can be comprehended only through a knowledge of offensive tactics. So the 2500 or 3000 officers of a cantonment are formed into classes and instructed as to German methods, the kinds of gases used, how the enemy place their cylinders, atmospheric conditions favorable to an attack and the advantages the enemy hopes to gain from a gas attack.—*Washington Evening Star*, 1/3.

STEEL SHELLS FROM STEEL CASTINGS.—The average citizen hardly realizes the extent to which specialization rules in the making of the weapons used in modern warfare. He probably supposes, when he gives the matter any thought at all, that in the place which he characterizes as a "munitions plant" all phases of the work of making the finished projectile are to be found. In this he is far from correct. Powder making is an industry in itself; so is the fashioning of the metal casing for the shell; while powder and casing both travel long distances to be brought together in a special establishment given over wholly to that work.

Perhaps the most interesting of all these processes is the actual making of the steel bodies for the shells. These bodies are ordinarily made by either one of two general methods. Some, especially the very large ones, are forged down from large steel bars or rounds, as they are called, which have been rolled from crude raw steel ingots or billets. Others, especially the smaller sizes, have been made from cast-metal ingots direct.

The latter method has assumed very large proportions in this country in the last two years. Probably 40,000 tons per month of such shell ingots are now being made in the United States. Both of these methods of making steel shells present many problems. Even skilled producers of steel have had much to learn and have had to profit by some serious losses. Besides this, the inspection by foreign governments has been and is extremely severe, necessitating in many establishments, radical changes in ingot and steel production.

The problems connected with the production of small ingots, while similar to those for large ingots, are quite different. While the larger ingots are later rolled down into billets and rounds or forged down direct, the small shell ingots are at once formed into shells. The three principal problems involved are elimination of pipes or hollow places, the elimination of segregation, and avoidance of surface defect.



REVOLVING TABLE CONTAINING MOLDS FOR CAST-STEEL SHELLS, READY FOR POURING FROM A STATIONARY LADLE INTO THE MOVING MOLDS.

The vital factor in the elimination of pipes has been found to be the use of the hot top with the iron mold. This top consists of a sand cup or basin, similar to that used for pouring steel molds and reinforced with an iron rod. It has been found superior to and cheaper than any brick or refractory hot top. By the use of this and the addition of a small amount of charcoal on top of the metal as soon as poured, the main pipe has been entirely brought out of the main ingot. That is, the hole left by the cooling and contracting metal is filled up constantly and uniformly by the still liquid steel above it.

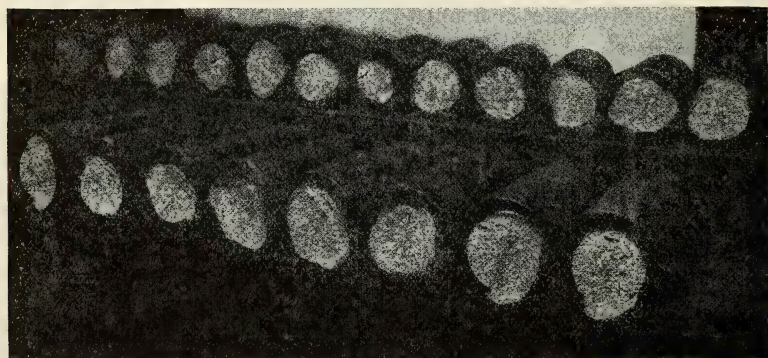
The avoidance of surface defects is largely bound up in the problem of the mold and its wash or lining. All shell ingots are made in cast-iron molds which have been found to be the only successful molds.

Most of the shell ingots made early in the last two years have been of the straight walled type, like a cylinder. As will be indicated later, there has been some objection to these in forging them because of the sharp edges at the bottom. In making recent 8-inch and 9.2-inch ingots a new type has been adopted. It has a tapered wall 8½ inches at the top and 7½ inches at the bottom, with a nose end. This is top-poured wide end up with a hot top and charcoal as in all other cases.

For pouring the small ingots a revolving table is used for greater speed and less loss of metal results than in moving the 25-ton bottom-pour ladle from one mold to another. This is shown by one of our illustrations.

Soon after pouring and while still at a cherry red the cast ingots are shaken out. The natural contraction of the steel makes this simple. As soon as cool enough they are removed a short distance to large friction saws. Here they are placed in a revolving mechanism where they are rotated while they are being nicked with the saw to a distance of about an inch into the ingot, and about two or three inches from the top—enough to insure a crop of 20 to 21 per cent.

The removal of this metal by a drop offers a fracture of the ingot comprising about 80 per cent of its area and affording ample surface for inspection for pipes or holes and porosity. The fractured ingots are rolled onto a table where they are chipped for surface defects and finally inspected by government inspectors before shipment to the forge shop. This inspection is urged by the company to be as severe as possible so as to avoid further losses.



ROWS OF CROPPED SHELL INGOTS, SHOWING THE CUT AND THE FRACTURE. IT IS IN THIS FORM THAT THEY ARE INSPECTED FOR PIPES AND HOLES.

The foregoing description briefly relates the process until the shell blanks are shipped to the various forge shops where they are finished into shells. Severe specifications must be met before the finished shells are accepted finally. That is, after the ingots or blanks have been converted into shells, representative tests are made of the metal. To guard against ultimate rejections there, the company at its place of manufacture casts representative ingots which it forges down into a bar $1\frac{3}{4}$ inches in diameter. After these bars are heat treated, that is, annealed similar to the final method at the forge shop, they are turned down and tested. The results so obtained afford a check on the final acceptance of the metal.

At the forge shops the blanks have a corresponding steel die, the shape of the finished shell, into which they are dropped after being heated to about 2100 or 2150 degrees Fahrenheit. They closely fit this die. A hydraulic ram hits one end of the ingot and forces it into the die until the hot steel completely fills the space. As soon as the hot steel has filled the die, a piercing ram is forced in, forming the hollow part of the shell, the excess metal oozing out at the back. The walls at this stage are about $1\frac{1}{2}$ to $1\frac{3}{4}$ inches thick. These rough shells are then annealed and machined inside and out to the proper dimensions.

In forcing the ingots, cast in straight cylindrical molds, into the dies, it has been found that the sharp edge at the bottom before long injures

the die. To overcome this the straight ingots have been cast with a curved edge at the bottom, formed by a solid mold which has a curve on the outside formed by a $\frac{1}{4}$ -inch radius. A still better method is the one already referred to and lately adopted—the tapering ingot cast with the nose end and wide end up.

The question of the relative merits of shells made from rolled rounds or from cast blanks has received some attention and it is claimed that in the case of transverse physical tests—those taken crosswise to the axis of the round—the cast round or blank is considerably superior to the rolled round.

Before the war the production of cast-steel shells was not large in the United States. There was but one plant devoted almost entirely to this class of work. Nor was the experience in making shells from steel rounds rolled from ingots extensive. Many foundries in the United States are now engaged in this important work and the number is growing constantly. Military preparedness has been one important result. But still more significant and striking are the metallurgical developments that have been brought to light. As the story unfolds it will be found that far-reaching advances towards sound steel have been the most vital achievement.

It is said that previous to the war Germany was the most skilled nation in making shells by the method described. It is surely the simplest. It is even declared that that country can successfully cast such shells hollow or ready for machining, eliminating the necessity of piercing and forging them. However this may be, the United States to-day is better prepared than ever, for many large and small steel foundries are now engaged in producing cast-steel shells.—*Scientific American*, 29/12.

NAVIGATION

ABERRATION OF SOUND SIGNAL.—The following instance of a silent zone near a fog signal is published for the benefit of those navigators who have not encountered this phenomenon or who have failed to take note of the caution published in the Light Lists issued by the Bureau of Lighthouses and by the Hydrographic Office under the heading "Fog Signals" in the introduction to those books:

"Proceeding to sea from Tompkinsville, Staten Island, January 17, we cleared the Ambrose Channel about 2.45 p. m., and about 500 yards to the westward of the whistling buoy Ambrose Channel light vessel was picked up. The wind was light westerly, that is, blowing from the ship toward the light vessel, and the distance from the whistling buoy to the light vessel is about $2\frac{1}{2}$ miles. The weather was somewhat hazy. Soon after sighting the light vessel it was noted that she was operating her steam fog signal and that the sound of the fog signal was inaudible. We passed the whistling buoy within 100 yards and proceeded toward the light vessel, half a dozen observers on the bridge being cautioned to listen for the fog signal and report when it was first heard. Four of these observers were officers. The fog signal was not heard until the light vessel bore 15 degrees, distant about 700 yards, when four observers distinguished the sound. When the light vessel bore 0 degrees, we turned to starboard and the course was set 180 degrees. The signal was not heard after the completion of the turn."—*Hydrographic Bulletin*, 20/2.

FORTY-FOOT CHANNEL AT HELL GATE.—The *Scientific American* is heartily in sympathy with Murray Hulbert, Dock Commissioner of this city, in his endeavor to secure a 40-foot rather than a 35-foot channel through Hell Gate. Forty feet is the standard depth for all channels liable to be used by the capital ships of the United States Navy. Thirty-five feet is a rather scant depth for our largest ships even in peace time; but in time of war,

when such ships might have to make port in a damaged condition and drawing, therefore, many feet more of water than their normal draft, 35 feet would be all too little. Strategically considered, the possession of two alternative routes for our battle fleet to the sea from the Brooklyn Navy Yard, one through the Ambrose Channel and the other by the East River, would be of the greatest advantage. We have 40 feet in the Ambrose Channel and the same depth ought to be available through the East River.—*Scientific American*, 9/3.

ENGINEERING

RECORDING STEAM EFFICIENCY BY METER.—America is again showing us the necessity of recording steam efficiency and so reducing works cost. The Martindale Company of Bay City, Mich., have designed a recording meter which records the ratio of two quantities: Pounds of water evaporated per pound of coal, pounds of steam per kilowatt hour, or pounds of yarn per horsepower. For this there must be record of both input and output. In a chart, tracing the efficiency curve of water evaporated per pound of coal, the input curve is a measure of the coal burned and the output curve is a measure of the water evaporated. The chart is of the circular type, with three tracing pens for the three curves. Beneath it are four input dials and four graduated output dials. One of these may be connected to a mechanical stoker, and another to the indicator of a V-notch water meter. The pointer on the coal dial is set at the position indicating the number of pounds of coal delivered at each stroke of the stoker plunger. The pointer on the water dial is set at the position indicating the pounds of water calculated as a unit from the water meter, by an integrator or meter-reading device. At each stroke of the coal plunger an electric contact is made, energizing an escapement mechanism which adds the quantity of coal delivered to the record of coal consumed. Similarly, electrical impulses add to the water record the amount of water passed through the meter. By means of mechanism comprising cams and dividing arms the third pen is made to record the ratio of these two quantities, so that it draws a continuous curve representing the water evaporated per pound of coal. As the meter is electrically operated the measuring apparatus may be separated entirely from the recording apparatus.—*Page's Engineering Weekly*, 25/1.

THE METALLURGY OF FERRO-CHROMIUM.—An article of a general nature describing the manufacture of ferro-chromium and chromium steel and outlining the use of the latter.

Chromium in steel does not act as a scavenger, nor does it confer soundness on the steel as do silicon and aluminium. But added in small amounts it increases the tensile strength of the steel to some extent without markedly decreasing its ductility. When added in excessive amounts it causes brittleness.

The effect of chromium when added to steel is to raise the normal critical range, thus causing changes to take place at high temperatures and also more slowly. Hence, chromium steels are harder than ordinary steels, because quenching more effectively prevents the transformation of the austenite. When added to iron, chromium does not materially harden the metal. Chromium steels contain from 1 to 4 per cent or more of chromium, and the carbon may range from 0.50 to 2 per cent.—*The Iron Trade Review*, 12/7.

ACTION OF SALT ON REINFORCED CONCRETE.—Professor H. J. M. Creighton, in a contribution to the *Journal of the Franklin Institute*, covering his investigations on the action of salt and brine on reinforced concrete, summarized them as follows: All concrete which is not water-proofed in some way is more or less porous to water and brine. Brine readily softens the surface of concrete, and therefore, more easily penetrates to the reinforce-

ments, on which it exerts a disintegrating action that, owing to the attendant expansion, gradually weakens the concrete, causing it to crack and split, and in some cases to fall away from the reinforcements. The more porous the concrete the more rapid the disintegration of the reinforcements through the action of brine. Reinforced concrete floors which come in contact with brine will gradually develop leaks. These will be followed by incrustations of discolored salt on the underside, where, later, iron-stained, hair cracks will develop running parallel to the reinforcements. As the deterioration progresses the cracks will widen, and, owing to the great expansive force of the accumulating iron oxide, the concrete will be gradually pushed from the corroded reinforcements and ultimately fall.—*Page's Engineering Weekly*, 25/1.

GROUND SCREW THREADS.—In a recent issue of *The American Machinist*, Mr. E. A. Suverkrop describes a process by which precision taps and screw gauges are produced by grinding the threads out of hardened stock, thus eliminating the risk of warping which arises when taps and gauges are made out of soft material and subsequently hardened.

The process has, it is stated, been used for making taps and gauges ranging from 0.157 inch in diameter, with 36 threads per inch, up to 4 inches in diameter with 4 threads per inch. In the case of the larger sizes the grinding process is merely used for finishing the tap, which is roughed out in the soft state, hardened, and then brought true to pitch and form by grinding. With small sizes, however, the thread is generated from start to finish entirely by the grinding wheel.

The grinding wheels used were supplied by the Norton Grinding Company, and have grains listed as 38-100 to 38-200, grades J and I. The blanks to be cut are mounted between the center of a cataract lathe, which is fitted with a buttress-threaded hob, which gives the traverse to the grinding-wheel. This wheel is independently driven and, mounted on its saddle is a truing device consisting of two diamond cutters, which can be traversed over the cutting faces of the wheel so as to maintain the accuracy of the angle between the flanks and the threads. The wheel is trued up on starting work and again when the work is within .01 of an inch of the finished size, and, finally, just before finishing, when the work is but 1 mil or 2 mils over size.

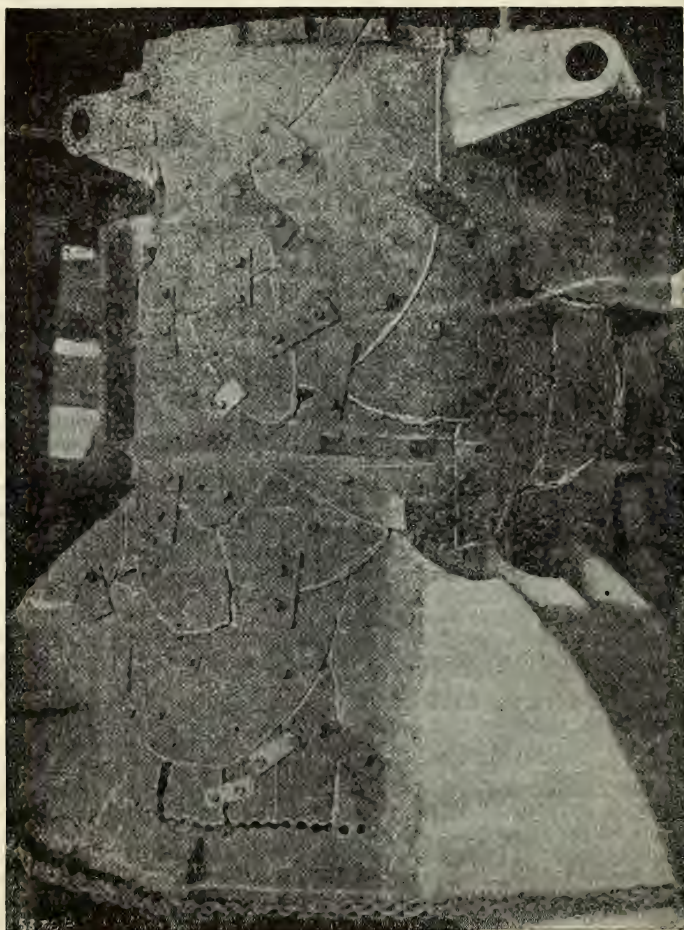
The machine, which is due to the engineer of the Presh Machine Works, Brooklyn, is stated to produce work accurate in every dimension within a limit of .0002 inch and .0003 inch.—*Page's Engineering Weekly*, 26/10.

REPAIRS TO INTERNED GERMAN VESSELS IN BRAZIL.—We reproduce a photograph of the damaged high-pressure cylinders of one of the German merchant ships interned in Brazil, as a result of the declaration of war between Brazil and Germany, as it illustrates the thoroughness of German destruction. The number of German vessels interned was approximately 45, totaling 235,000 gross tons. These had been more or less all seriously damaged, particularly the propelling machinery, and in some cases new cylinders throughout had to be made; in others only portions of the cylinders had been destroyed. The thoroughness of the work done by the German engineers is suggested by the fact that in one case of two damaged cylinders at least 8000 holes must have been drilled transversely and vertically through the cylinders, in order to effect complete destruction. Several of the vessels were taken over by the Brazilian Ministry of Marine and others by the Lloyd Brasileiro Company.

In the early part of 1917 the Brazilian Government invited Messrs. Vickers, Limited, who had placed their experience at their disposal, to send an engineering technical officer to Brazil to survey the damage to the machinery and carry out the necessary steps for its repair. It was found that not only could the work be carried out in Brazil itself, but in the naval arsenal of that country. It was, therefore, decided by the Ministry of

Marine to proceed immediately with the re-casting of the damaged cylinders and liners, and great credit is due to the engineering officers of the Brazilian Navy and to the personnel of the arsenal, not only for executing the work, but for the expedition with which it was carried out.

The photograph we reproduce is of the high-pressure cylinder of a quadruple set of engines, the diameters being $26\frac{1}{10}$ inches, $38\frac{3}{8}$ inches, by 54-inch stroke. The cylinders illustrated had been broken into hun-



DAMAGED CYLINDER OF GERMAN SHIP INTERNED IN BRAZIL.

dreds of small pieces, and in order to make new cylinders to suit the set it was necessary to collect as many pieces as possible and to erect them as illustrated, so that the dimensions of the cylinders could be measured accurately. When erected, photographs were taken, and we are indebted to the Brazilian Minister in London for permission to reproduce these photographs. Portions of cylinders were also re-cast and welded in position in the engineering workshops in Brazil.

It is an interesting fact that most of the broken parts of the machinery were, in the case of the greater number of vessels, carefully stored between decks, evidently in order to be used as scrap metal in Germany, in the event of the return of the ships to the "Fatherland."—*Engineering*, 15/2.

MAGNESIUM CHLORIDE.—*Its Action on Boiler Plates.*—Although engineers proficient in their work are fully aware of the behavior of magnesium chloride in connection with plates and tubes, there is evidently much justification for extending the knowledge into many quarters where the baneful significance of corrosion is not sufficiently realized. We hear quite a lot concerning scale and its accompanying mischief; but the insidious action of magnesium chloride is still more striking, yet there is no actual deposit of it, either in the water or on the metal. It has, indeed, proved to be one of the most mysterious of destructive agencies, and only the closest scientific investigations have enabled engineers to ascertain the whole measure of its possibilities, and to devise methods for its suppression. It is, therefore, worth detailed consideration.

The peculiarity about magnesium chloride is that it is always responsible for corrosion of the metal above the water-line in boilers, besides steam pipes and condenser tubes, etc. The reasons for these phenomena are understood when magnesium chloride is studied. Upon heating the solution it does not evaporate and leave salt sediment, as do the vast majority of substances—for example, the other mineral contents of water—but decomposes into magnesium oxide and chlorine. The former is produced by the abstraction of oxygen from the water, and its union with the magnesium, the chlorine from which is liberated so that it rises with the steam and settles on various parts of the metal as hydrochloric acid, having become chemically combined with the hydrogen of the water. Magnesium chloride is a compound of magnesium (or magnesia), and chlorine, the latter being derived chiefly from the decay of animal and vegetable refuse. As already stated, it exists only in solution, unless exceptional trouble is taken to solidify it. This matter will be referred to again.

On land, the principal source of magnesium chloride is the magnesian limestone, or dolomite, beds, rocks, or soil, through which rain passes, and thus by means of assistant chemical agents, disintegrates and dissolves the mineral matter. Chlorine is the necessary converting element, and this is generally found incorporated with the water as hydrochloric acid. The latter in attacking the magnesian limestone—this is a combination of magnesium carbonate and lime carbonate—drives out some of the carbon-dioxide therefrom, and itself seizes upon the magnesium, thereby constituting a solution of magnesium chloride, which is carried away into springs and channels used as the water supplies for boilers. In marine directions the magnesium chloride emanates direct from the sea, where it occurs quite normally on the average of about 3.15 per 1000 parts. Unless it is satisfactorily counteracted its steady, persistent operations eventually cause very disastrous effects.

It will be plain that while magnesium chloride is contained in the water of the boiler it is in a neutral condition, and cannot injure the metal. But upon the application of heat it is split up into magnesium oxide, which sinks as a fine white innocuous powder, and chlorine, which rises into the spaces above and away from the body of water, and becomes hydrochloric acid. It is on this account that the metal below the water-line is not affected by it; whereas the other portions are gradually exposed to its destructive tendencies.

The salt, magnesium chloride, can be obtained in the solid, fused or melted state by roundabout processes; but it is then so unstable that immediately upon being exposed to the air it absorbs the invisible moisture therefrom, and becomes a solution again. It cannot be properly isolated by boiling its solution as it exists ordinarily in water, but systematically

changes in the manner previously described. If ammonia were present in the same spaces where chlorine, and subsequently hydrochloric acid appears, the acid would combine with the gas and yield chloride of ammonia (better known as sal ammoniac), which being a soluble salt would descend and dissolve in the water; and nullify the corrosive properties of the hydrochloric acid. This re-action is not suggested as a remedy, for very good reasons; but is mentioned to explain how curious are the available modifications.

Chlorine and its vapors have bleaching powers, as can be demonstrated by suspending a colored fabric or paper within it. Suppose that a large strip of blue litmus paper is placed in the boiler above the water-line, or in the adjoining pipes. If magnesium chloride is present in the water heat will drive the chlorine up into the color, and this gas will remove some of it, making the fibers white, but after awhile, as the hydrogen of the steam

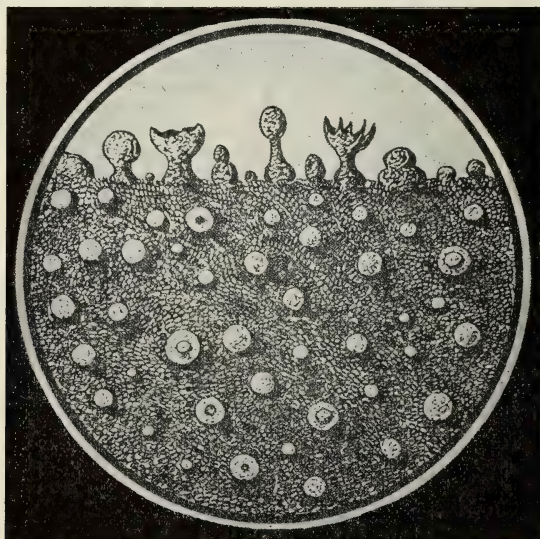


FIG. 1.—About one-twenty-fourth inch of the surface and edge of a piece of boiler-plate after the action of acid from magnesium chloride. This is an early stage—magnified.

unites with the chlorine to compose hydrochloric acid, the latter will turn the blue into red, thereby establishing its acid nature. It is obvious that where the metal is pitted there has been concomitant disintegration and removal. The combination of it with hydrochloric acid forms a salt called iron chloride, which separates as a greenish or brownish solution, and falls into the water, where it may mix with the lime and other magnesium residues, or sludge, and tint it accordingly. If weak, the whole deposit will be greyish, owing to the admixture of abundance of white salts with it. If stronger, it will impart a greenish or brownish tinge to the other minerals. It may affect adhering scale as well, in severe cases. These shades are altered by the presence of various foreign matters, such as true rust or dirt.

The hydrochloric acid produced as outlined is, of course, diluted by the steam, or water into which it condenses. It depends on the extent of

corrosion of the metal by it whether a ferrous or ferric salt results. Intermediate, indefinite, grades are naturally also possible. Ferrous chloride is greenish; while ferric chloride is reddish brown. The former may be fairly bright, or else dull; and the latter rusty-looking, or else almost black. The various products merge one into the other, extremes passing indistinguishably into those stages which intervene. On microscopical examination of the corroded particles one can see ranges of color through yellow, brown, green, and red of striking gradations. The terms of ferrous and ferric indicate two phases of iron, the first named containing less oxygen than the second, and being capable of rapidly changing into it. Ferrous chloride is, therefore, iron chloride of weaker constitution than ferric chloride; but both are compounds of iron and hydrochloric acid. (By the way, the chemist never speaks of salts of *steel*; because the latter and iron are essentially the same.)

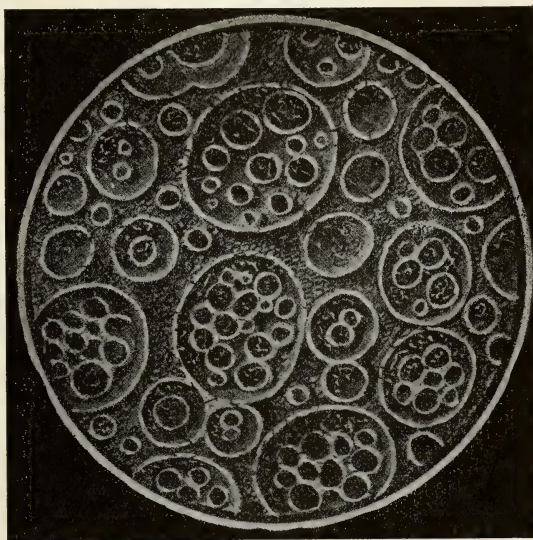


FIG. 2.—About one-twenty-fourth inch of the surface of a piece of boiler-plate after the action of acid from magnesium chloride. This is a later stage—magnified.

In boilers that cease working for a time some of the hydrochloric acid would still stick to the metal; and as cooling followed would form portable chloride salts; the greener ones being crystalline and the browner ones amorphous. Their details become pronounced when the substances are scraped off and examined by themselves.

In Fig. 1 is shown a piece of boiler plate, experimentally subjected to the action of hydrochloric acid vapor evolved from water containing magnesium chloride. The minute greenish, reddish, or brownish beads thus formed by the corrosive globules are mostly stalked, and hollow.

In Fig. 2 is shown a later stage, after a lot of the metal has flaked off. Multitudes of minute pores (basins left after splitting of the hard beads) cluster together, the pitting going deeper and wider as flaking continues.

—*The Marine Engineer and Naval Architect*, January.

STANDARD PROPELLING ENGINES FOR BRITISH STANDARD SHIPS.¹—In supplement to our article on British Standard Ships, which we published in an earlier issue (page 553, *Engineering*, 1917), we now give illustrations of the standard engines designed and built for these ships. The main engine design does not present any new features, and is fairly representative of that usually adopted for triple-expansion engines having cylinders 27 inches, 44 inches and 73 inches diameter by 48-inch stroke. The outstanding feature, which indicates that the design is of Clyde origin, is the front columns which carry the piston-rod guides, as against the slipper-type guide which is a feature of the northeast coast design. Special attention has been given to details for convenience in machining and assembling, the piston type of valve for the medium-pressure cylinder, for example, being adopted chiefly on that account. The circulating pump, which is of the centrifugal type, 12-inch bore branches, is mounted with its engine on the main engine bed-plate so as to enable it with its pipes and connections, to be fitted complete in the erecting shop. The reversing engine is of the usual all-round type, and an independent turning engine is provided.

All the designs, with the exception of the auxiliary machines, were, of course, prepared by one firm, who had extensive experience in machinery of this size for cargo vessels, and were issued to the various machinery contractors complete, together with full detail specifications of all the raw material orders and the finished items which it was arranged to obtain from sub-contractors. A degree of detail quite unusual for this class of work was embodied in the drawings and information issued, so that even those firms who were not familiar with such work—some of them accustomed to a smaller class and others to the highest class of Admiralty work—would have no difficulty in knowing exactly what was required.

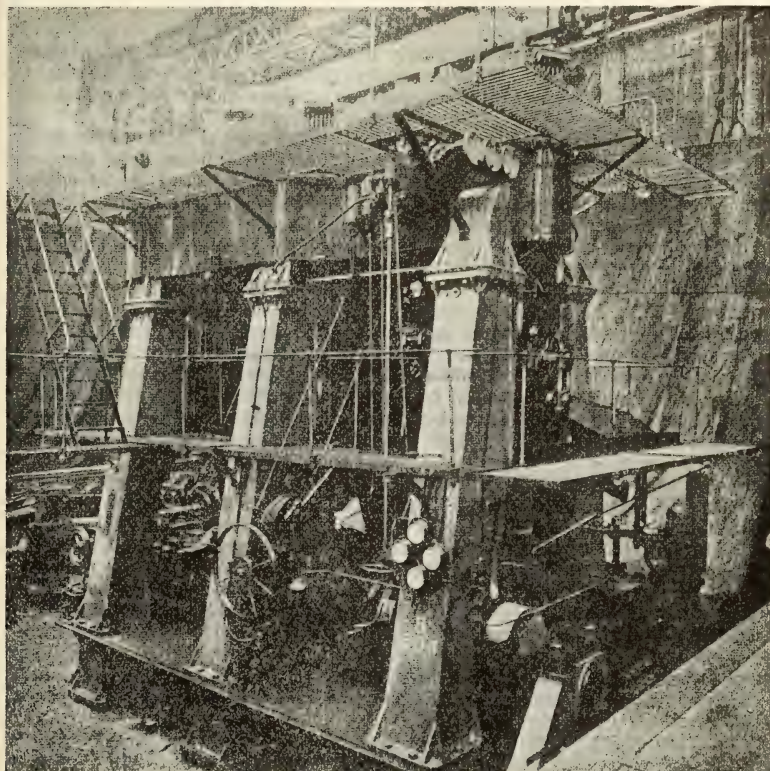
The advantages of manufacture to a common design were found of convenience in many ways as when, in the course of construction, one firm discovered defects in a sole-plate casting; this was at once replaced by a similar casting from another firm, who were not at the time requiring that casting, failing which possibility of delay of weeks would have occurred with the erection of the whole engine. Another instance was the facility with which a replace main steam pipe branch piece was immediately despatched to a vessel ready for trial trip, when the original one showed leakage on the first steaming of the engines. The greatest advantages of this manufacture of details in multiple were, of course, experienced by the sub-contractors for these details, as they were thus enabled to proceed with a very large number of each article exactly alike instead of each differing, perhaps only in very small points, to suit the arrangements prepared by individuals, but sufficient to prevent them being used for the first firm requiring delivery.

It can readily be understood that many of the small items in a modern cargo vessel's engine-room could be manufactured to better advantage by specialists, than by large firms whose plant is generally suitable for large work, the items of which are different for each vessel, and especially so when orders for scores of these smaller items could be placed at a single time. The orders for all the auxiliary machinery, also the various valves, valve-boxes, branch pieces, cast-iron and wrought-iron pipes, etc., were consequently issued in multiple, from a single source, and placed with firms who specialize in such work so that once they had prepared patterns and templates to the drawings they could manufacture these fittings for all the vessels, drilled and ready to fit in place. For instance, the main steam pipes were finished complete by tube-makers to drawings, having been so designed that the unavoidable inaccuracies in fitting boilers and engines in place could be taken up at the joints and thus overcome the delay which otherwise invariably occurs through having pipes made to fit the place after everything else is in position.

¹ From *Engineering*.

The smaller castings for the main engines were also ordered in multiple, thus avoiding unnecessary pattern-making, as all the firms on the Clyde were supplied with those castings from two sets of patterns in all. This procedure enabled the machinery contractors to concentrate their attention on the bigger things with the knowledge that the smaller things were, so far as they were concerned, looking after themselves.

The positions of the auxiliary machinery were arranged so as to give the least work in completing the vessel after it was launched, the positions being so chosen that all erection could be completed in the shipyard before



From Engineering

STANDARD TRIPLE EXPANSION ENGINES FOR BRITISH STANDARD MERCHANT SHIPS—FRONT VIEW.

the launch, the various connecting pipes being of the simplest form while providing all the conveniences for working usually found in first-class work.

The feed filter, which is of the gravitation type using coir fiber, open to observation and replacement while the engines are working, is embodied in the main engine hot-well attached to the air pump, so that it is completely fitted in the engine works and no pipes and connections at all are required for it. The feed heater is of the well-known mixer type, and is also embodied in the main engine hot-well, the whole making a very compact arrangement with the minimum of fitting work. The evaporator is of the

vertical type, capacity 25 tons per day, and conveniently arranged at the back of the main engines.

The winches are of the usual plain cargo-vessel type and number, arranged to exhaust to a winch condenser placed in the engine-room. The winch condenser is of ample size to deal adequately with the exhaust from the winches and so facilitate expeditious discharge of cargo. A general service donkey and a harbor-feed donkey are provided, both alike, of the single direct-acting type, with $9\frac{1}{2}$ inches diameter steam cylinder, 7-inch diameter water cylinder, 18-inch stroke, and capable of feeding boilers in port or at sea, the harbor-feed donkey being fitted with automatic control from a float which operates with the water from either main engine air pump or winch condenser.

The ballast donkey is of the single direct-acting type, 11-inch diameter steam cylinders, 14-inch diameter water cylinder and 24-inch stroke, to quickly discharge water ballast from the various tanks throughout the vessel.

Owing to prevailing circumstances the use of copper piping had to be avoided. Wrought iron has been largely used throughout, only the very small pipes being made of copper. As a result, the total weight of copper piping is less than one-sixth of that usual in this class of vessel.

The boilers—three in number—are of the well-established multitubular return-tube type, 15 feet 6 inches diameter by 11 feet 6 inches long, for 180 pounds working pressure, working under Howden's system of forced draft. They do not present any special features, although it may be mentioned that the original design, prepared for the minimum among of workmanship and expeditious construction, had to be modified in later boilers on account of the present demands on steel works for large plates, so as to enable those available to be utilized. The principle of manufacture in multiple was adopted for boiler parts also, this applying to such items as tubes and furnaces, the latter being finished to one set of templates for all firms.—*Scientific American*, 26/1.

PROPULSION OF SHIPS.¹—The object of this paper is to emphasize the necessity for experiments on the resistance and propulsion of ships.

That work is done on models of ships in experimental tanks is probably well known. The experimental tank, however, cannot, of itself, give all the information required to establish the science of ship resistance and propulsion on a firm basis. The limited knowledge of the science renders necessary a number of approximations, and errors are consequently introduced when estimating the resistance of a ship from its model. There is, however, no other method available. In addition, to extend our knowledge much work remains to be done with models. The coordination of model experimental results and observations on full-sized ships, herein advocated, would settle many doubtful points.

The Value of Model Experiments.—It was about 50 years ago that the late William Froude built a model tank at Torquay. Since then, a few tanks have been built in this country, but, with one exception, they are not for public use. There is an Admiralty tank at Portsmouth; two large and four small ones are owned by private shipbuilding concerns. The one already referred to, available to all those interested, is the Yarrow tank at the National Physical Laboratory, Teddington. That good work has been done in these tanks goes without saying, and it is not too much to say that practically all the progress made in ship resistance and propulsion during the past 50 years is due to them.

Ship Resistance Deduced from Models.—The resistance to the motion of a ship is generally divided into four parts, namely, the skin, caused by the friction of the water on the surface of the vessel, the wave making, the

¹ Read by Mr. A. T. Wall, M. I. N. A., before the members of the Liverpool Engineering Society, in December, 1917.

eddy making, caused by unevenness of the surface such as occurs with appendages and air or wind resistance. The eddy resistance should be small, although it is not always a negligible quantity. Wind resistance depends on the above-water form of the ship. Skin resistance is accompanied by eddies or whirls in the water near the ship's surface, but this is not included in the expression, eddy making resistance, as used above, for ships. The skin resistance of a ship form, whether of model or ship, is estimated by a formula derived from experiments on plane boards. The maximum length of the boards used was 50 feet, and the maximum speed at which they were towed 8 knots. It was found that the resistance of the boards varied as the product of a co-efficient, their area and a certain power of the speed. The co-efficient varied with the length. Different experimenters obtained slightly different values for the co-efficient and the power of the speed, but the differences are not great.

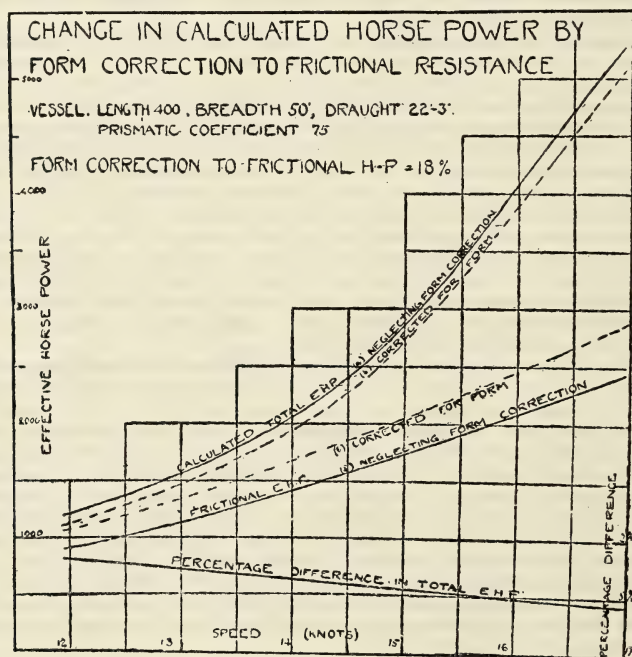
In estimating the skin resistance of a model or a ship it is assumed that the curved surface is equivalent from the point of view of skin resistance to the resistance of a plane board having an area equal to that of the under-water surface of the ship and of the same length. To extend the results to lengths greater than 50 feet it is assumed that every square foot of surface above the first 50 feet of length as a resistance equal to that of the last square foot on the 50 feet plank. It is also assumed that the index of the power of the speed is the same for speeds greater than those of the experiments. There may or not be any appreciable error introduced by these assumptions, but experiments on a large scale would settle all doubts. In this connection Mr. G. S. Baker, in his paper read before the North-East Coast Institution, in 1915, said that these matters could be settled by towing a boat built in the form of a plank, or by towing an old mail steamer with its appendages taken off. Although this would involve time, labor and money, it is necessary this should be done.

When models of ships are made for resistance experiments appendages are usually omitted and there is very little above-water portion, so that the wind resistance is negligible. The resistance of the model, therefore, consists of the skin and wave resistances. The total resistance of the model is measured and the skin resistance calculated, as already indicated. The remainder is taken to be the wave-making resistance. To this remainder Froude's Law of Comparison is applied to estimate the similar resistance of the ship. The skin resistance of the ship is estimated in the same way as for the model, so that the total resistance of the ship is obtained by adding these two together. Froude tested his Law of Comparison by comparing the results of the model tried in his tank at Torquay with that of the full-sized ship towed by another. This law has been of immense use in the science of ship propulsion, and illustrates at least one good result of work done on a full-size ship.

Ship Forms and Plane Boards.—It has been very definitely established that Froude's Law of Comparison applies with great accuracy to the wave-making resistance. In spite of this, however, there is a possible source of error in estimating the resistance of the ship from that of the model in this way. The ship form differs in its behavior with regard to skin resistance from that of the plane board, the value of the former being greater than that of the latter having the same length and area, and this increase is greater the fuller the form of the ship. Experiments² carried out by Mr. G. S. Baker in the Yarrow tank at Teddington show that at the slowest practicable speeds models give a resistance exceeding that deduced for a corresponding plank by an amount varying from 5 per cent to 20 per cent. Unfortunately, this increase is not the same for the ship as for the model, and it is not possible to say with accuracy what its value is for the former, although it can safely be said that it is not so great as in the model.

² "Transactions," Inst., N. A., Vol. LV., Part II.

The effect of this can best be illustrated by an example. In slow-speed merchant ships, where the under-water form is full, the skin resistance of the model may be as much as 80 per cent of the total, that is, supposing that the skin resistance is calculated as if the surface were a plane board. To the remaining 20 per cent, therefore, Froude's Law of Comparison would be applied. Actually, the skin resistance of the model being, say, 20 per cent above the calculated figure, it is in reality 96 per cent of the total and the wave resistance only 4 per cent. It is to this latter figure that Froude's Law of Comparison should strictly be applied, and when the skin resistance of the ship is calculated it should also be increased by some percentage which is at present unknown.



The accompanying diagram shows two effective horsepower curves obtained for a 400-foot ship from the results of a model run in a tank. The upper curve is derived as is usual at present. The lower curve has had the form correction for skin friction applied (the same value as in the model). The differences in the two results expressed as a percentage can be seen from the diagram. These percentages are somewhat greater in a longer vessel at the same corresponding speeds but decrease substantially with decrease of lengths.

The Law of Skin Friction.—In 1912 it was pointed out by Dr. Stanton in a paper before the Institution of Naval Architects in which surface friction was discussed, that provided a body was submerged to such an extent as to avoid the formation to surface waves and that the velocity at which it was moving was not high enough to cause cavitation, the resistance of the body will depend solely on its dimensions and nature of surface, and on the velocity, density and viscosity of the fluid. In such a case, by the applica-

tion of the principal of dynamical similarity, it is possible to predict the friction and eddy making of a ship from its model. This is a particular case of Rayleigh's General Law, which may be expressed as follows. The frictional resistance per unit area of a surface is proportional to the squares of the corresponding speeds. The corresponding speeds are those such that the product of the speed and the linear dimension of the body is constant. This, of course, is different from Froude's Law of Comparison, which makes the corresponding speeds vary as the square root of the linear dimensions. The first law is considered by many to have been definitely established, with the result that they say it is the only safe one to use for resistance experiments on dirigible balloons, submarines and torpedoes. Unfortunately, since the corresponding speeds are inversely proportional to the linear dimensions it would be necessary, in order to determine the resistance, say, of a submarine submerged at 10 knots, to drive the model, say, on a scale of one-tenth the full size, at 100 knots and the force required to drive the model at this speed would be the same as for the full-sized submarine at 10 knots. This is at present impracticable, and therefore the ordinary method is used for computing the resistance of submarines from model experiments.

This law has an interesting application in that it can be used to find the resistance of a dirigible balloon from that of a scale model run in water. For this purpose if V is the speed of the full-sized dirigible, L and l linear dimensions of the balloon model, and the latter must be towed at a speed represented by $\frac{VL}{13L}$. The resistance of the full-sized dirigible at V feet

per second will be the resistance of the model in water divided by 4.7 approximately. The Froude Law of Comparison is applied to wave and eddy making resistances, although Dr. Stanton has stated that it appears possible that the eddy making resistance per unit area of a full-sized ship may be from 10 to 15 per cent different from that of the ordinary sized model used in tank experiments. In consequence, he says, the application of the Law of Comparison to eddy making is not strictly correct, although the error involved must generally be a small one. This is quite distinct from the difference already pointed out between the skin resistance of a ship-shape form having the same area and length as a flat plank.

An interesting application of the law of dynamical similarity was mentioned by Mr. G. S. Baker in the discussion on Dr. Stanton's paper. After showing that the law held fairly closely for flat surfaces in water he went on to say that it would be possible by its use to obtain—as Dr. Stanton had suggested—the absolute value of the wave-making resistance of a model from results obtained with full-sized ships. For this purpose it would be necessary to moor a ship in a slow tidal current and measure its resistance and work from the ship to the model to find its frictional resistance. For the high speed of the model the friction and eddy making resistance can be obtained and so, working backwards instead of from model to ship as is usually done, it would be possible to differentiate in a manner not heretofore possible, between frictional resistance and wave making resistance of the ship-shaped form running at high speeds. This would enable the increased resistance of ship-shaped forms over plane surfaces to be measured.

In the discussion on Mr. Baker's paper read at the North-East Coast Institution of Shipbuilders and Engineers in 1915, it was generally agreed that there was a great need for verification of the elaborate and interesting work Mr. Baker had done on surface friction of models by means of full-sized experiments. Mr. A. W. Johns also thought that, after reading the paper, one was forced to the conclusion that much experimental work had yet to be carried out before our knowledge of the skin resistance of ships was placed on a correct basis.

The effect of Mr. Baker's modifications to the method at present in use for computing skin resistance is very great, as shown below:

Effective horsepower in *Greyhound* (172 feet long).

	At 6 knots	At 11.84 knots
Froude	40.9	630.7
Baker	38.6	613.3

Effective horsepower in ship 600 feet long.

	At 18 knots	At 20 knots	At 22 knots
Froude	7,160	10,240	14,730
Baker	6,225	8,900	12,980

This matter also received attention in a paper by Dr. Lees, read before the Institution of Naval Architects in 1916. He stated that the subject would be put on a much firmer basis when data for boats of intermediate sizes has been secured by measurements made on submarines 100 to 200 feet long towed under-water. In the discussion that followed this paper, Professor Dalby stated that there was a need for additional data derived from experiments with ships of large size in order to get better correlation between actual resistances and the resistances deduced from models. Such data would enable a better interpretation of the model results to be made. To put the proposal in a concrete form, he stated that a large liner or a powerful battle cruiser should tow a series of ships of modern dimensions, in order to definitely establish what are the resistances of long ships at different speeds. The technical difficulties in this would easily be overcome. The real difficulty is one of expense and the general reluctance to spend money on scientific experiments. Considering the magnitude of issues at stake both for the Admiralty and for the mercantile marine, the financial difficulties should not be insuperable.—*Marine Engineer and Naval Architect*, January.

AERONAUTICS

AN ADDITIONAL LIFTING FORCE FOR AIRPLANES.—By Carl Hering.—The lifting force in the usual airplane of to-day is that due to a plane inclined slightly to the direction of motion, and forced forward by the propeller. It acts in a vertical direction according to the same principle that the rudder of a ship acts in a horizontal one. The lifting force is due partly to the compression of the air below the inclined plane, and partly to the suction of the rarefied air above it. Both of these forces act only when the plane is in motion, hence are zero when it is at rest and are very small when the airplane is starting from the ground or the sea.

In the helicopter principle the propeller moves in a horizontal plane and lifts by direct propeller action; but this has not come into general use, and it is said to require about six times the power to lift in this way as by means of the forward-moving inclined plane.

There is a third and quite different kind of lifting force which is available in all the propeller-driven airplanes of to-day, but which is not now used. It would require but slight changes in the present construction to make use of it, and as it seems to consume no additional power, it is of the nature of a gift; it is there to be used but is not at present being made use of; its use has been overlooked or neglected. It is of special interest as it is greatest when the airplane is at rest and therefore just when the usual lifting force is least, hence at the very time when any addition to the lifting force, even though small, is very important. One of the serious drawbacks in the use of modern airplanes is that when they start from the ground a comparatively large area free from obstructions is required for getting up sufficient speed, while on the ground, to produce enough lifting force to raise the airplane up high enough to clear the trees, telegraph poles, buildings, etc.

The principle of this new lifting force is best illustrated by some well-known experiments. Referring to Fig. 1, let N be a nozzle through which a stream of air is issuing in an upwardly inclined direction. When a ball B is placed just below this stream a short distance from the nozzle, it will be found to remain suspended; the ball may be said to be hung on to the bottom of the air stream considered as a sort of a beam.

A possible explanation of this peculiar phenomenon is that the stream of air causes a partial vacuum above the ball and that the ball is therefore supported by the air pressure from underneath. If this is the correct explanation, the theoretical maximum lifting force which could be produced in this way would be atmospheric pressure, namely, a little more than one short ton per square foot, a maximum which of course could never be expected to be nearly reached, but a very tempting one to approach as closely as possible; obtaining only as little as 1 per cent of this would still be 20 pounds per square foot, which is very large compared with the present lifting and sustaining force which is said to be about 4 to 6 pounds per square foot, and this only at high speeds, it being zero when the plane first starts. If this explanation of the phenomenon is correct, the experiment of suspending a ball from a stream ought not to operate in vacuum, in which case a stream of some other fluid than air would of course have to be used, one with a low vapor pressure, like mercury for instance. It is not known to the writer whether this has been tried.

Another form of this force is illustrated in the well-known experiment shown in Fig. 2 in which a horizontal card C has a hole H cut into it; by blowing horizontally over this hole a card C placed below it will be held up by the air stream. In the usual form of atomizers it is this same force that lifts the liquid in the vertical tube, the horizontal air stream creating a partial vacuum above that tube. A sheet of paper held under the air stream from an electric fan will be supported horizontally by this same force. A very strong wind blowing over a tin-covered roof will sometimes tear off the sheet metal due to this same force.

Another form of this phenomenon is illustrated in the well-known experiment shown in Fig. 3. A disk D is secured to the end of a tube T , like a large flange. A second disk d with a pin P merely to keep it centered with the tube, is held beneath the first disk D . On blowing down through this tube the second disk d will be found to be held up, notwithstanding that the stream of air pushes it down in addition to gravity. The stream of air spreads out between the two parallel disks, and if the above explanation is correct, it tends to create a vacuum above and below it which forces the disks together; it should not operate in a vacuum. It is not true, as has been claimed, that the two disks must be of the same size; the lower one may be larger or smaller than the other.

With such disks 4 inches in diameter, a $\frac{1}{4}$ -inch bore tube, and by weighting the lower disk until it could barely be held up by blowing through the tube with the mouth, the writer obtained a sustaining pressure of about $\frac{1}{3}$ of a pound per square foot. The actual sustaining force must have been still greater, as it had to react against the direct impact of the air stream through the tube. In a similar case, reported to the writer, in which this pressure was not wanted, and in which high air pressure was used and the two disks were held securely in place, this pressure became great enough to wrench the upper disk from the tube to which it was secured by graphite set screws; this shows the force to be quite great.

This experiment, however, is not an exact parallel one to the intended application of this force to airplanes, as the force sustaining the lower disk is in part reacted by a downward force on the upper side of the upper disk; the tube and its disk would no doubt weigh more when the lower disk was being held up by it. Applied correctly to airplanes there should be a plane below the stream but none directly above it.

In the modern biplanes, however, in which the stream of air behind the propeller generally passes between the upper and lower planes, the phe-

nomenon is similar to that in this experiment and no doubt an upward force of this kind exists on that part of the lower plane which is below the air stream, but a nearly equal downward force would probably be found to exist on the corresponding part of the upper plane, hence there would be little or no gain. It is quite likely that if the canvas were cut away in that part of the upper plane which is above the air stream, the upward force on the lower plane would be a net gain, at least when starting from rest. If so, it would be a curious case of increasing the lifting force by cutting away some parts of the present planes. But this would depend greatly on whether the shape and location of the lower plane is the most appropriate one.

To make this new force available in an airplane it is necessary to hang the weight onto the bottom of the air stream, as though the latter were a

Fig. 1.

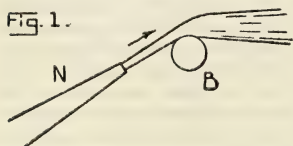


Fig. 2.

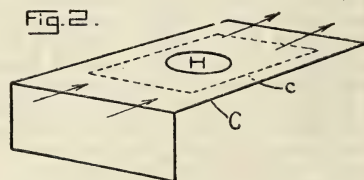


FIG. 3.

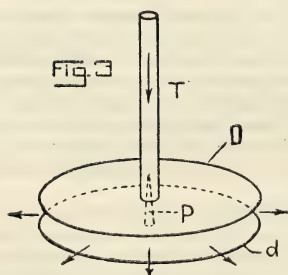


Fig. 4.

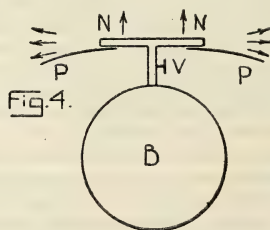
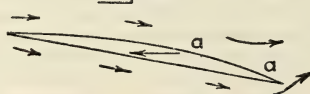


Fig. 5.



SIMPLE EXPERIMENTS WITH A NEW LIFTING FORCE, AND A SECTION OF AN AIRPLANE WING.

sort of beam. This is done by adding a suitably shaped plane just below the air stream and secured to the framework of the airplane. This beam will be deflected downward by this weight, but this kind of a beam, depending for its stiffness on the inertia of the moving air, has the peculiar property that the force of a weight suspended from it will not be transferred back to the origin or support of the beam, namely, the propeller, notwithstanding the contrary opinion of those who claimed it was a case of "lifting yourself up on your boot straps." When a projectile fired from a gun strikes an inclined surface and is deflected, the side thrust deflecting it does not react on the gun.

As this point was raised by several physicists, the writer made the experiment shown in Fig. 4. *B* is a rubber bag containing compressed air. When the valve *V* is opened the air is discharged through the two diametrically opposite nozzles *NN* which are exactly in line with each other. The curved

planes *PP* were secured below these nozzles so as to be just below the air streams. The whole was suspended so as to be free to move in any direction. When the valve was opened the whole apparatus moved up. When the planes were put above the streams it moved down. When one was placed to the right and the other to the left of the stream, the whole apparatus revolved. This showed conclusively that there was no equal and opposite reacting force on the nozzle.

In principle, this method as applied to airplanes may be said to be lifting it by creating a partial vacuum above it, but in such a way that the corresponding downward force on this vacuum is sustained by the moving stream of air acting as a beam which is not supported by the airplane itself but by the inertia of the moving particle of air. The velocity of the air and its density, therefore, are important factors in the sustaining strength of this beam.

In physics this phenomenon is a consequence from what is known as the Bernoulli theorem, and it seems from this that this lifting force increases with the density of the material in the stream and with the square of the velocity. If this is correct this lifting force would increase rapidly with an increase of velocity of the air in the stream.

There is a very strong tendency of this force to produce oscillations in a flexible plane; it is this phenomenon which produces the flapping of the loose end of a flag in the wind. This tendency is so strong that a piece of apparatus carefully made of hinged links of sheet iron was instantly torn to pieces under a stream from a compressed air-chamber. Under the air stream of a propeller having only two blades the resulting pulsations in the air streams also gave rise to quite powerful tendencies to oscillate; so great were these oscillations that it was difficult to measure the average force.

The exact form of the curvature of a plane under an air stream to obtain the best results seems to be of considerable importance, as slight changes of curvature seem to change the results very decidedly. A perfectly straight plane gives very poor results. The air stream expands and is no doubt also drawn downward by the vacuum caused by the presence of such a plane; the correct shape of the plane seems to follow this curvature approximately; the plane should be sufficiently far from the stream to produce a partial vacuum between them, but should not be too far off to have this vacuum too easily broken by intrusions of air from the sides.

By moving such a plane through a range of angles this force will be found at first to increase as it approaches parallelism to the stream, then attains a maximum, and then reverses when the stream impinges directly on to it. The best shape seems to approximate that of the large end of a trumpet cut in half, though a recent test showed that the air stream a short distance from the propeller at first contracts slightly, hence the first part of the plane nearest the propeller should rise slightly at first and then bend downward. If extended too far along the length of the stream that component of this force which is in the opposite direction to the forward motion of the airplane may become too great.

Immediately below the propeller blades this suction force was found to increase very greatly, being of the order of magnitude of 12 to 15 pounds per square foot; but there were no means of measuring how much of this, if any, reacted downward.—*Scientific American*, 9/2.

SMALL ARMS FOR AERIAL USE.—*Tests Indicate U. S. Is Well Supplied with Best Types.*—Successful development of special types of small arms ammunition for use in aerial warfare is announced by the War Department. These include armor-piercing cartridges, incendiary cartridges and "tracers."

Bullets able to pierce steel became necessary when, in the early months of the war, both sides began to equip the vital parts of airplanes with light armor. "Tracer cartridges," leaving a trail of smoke, used to enable the

machine-gun operator to ascertain whether his shots are correctly aimed, and the incendiary bullets set fire to the contents of the enemy's fuel tank.

Recent tests, the announcement says, indicate that the United States has developed these types of special ammunition to a point fully equal or surpassing anything used abroad.—*Washington Evening Star*, 4/3.

VENEERED SPARS AND STRUTS.—It is a well-known fact that the present methods of applying silver spruce to aircraft construction are very wasteful, for nearly 50 per cent of the wood has to be cut to get the requisite degree of lightness for struts and spars. England is now suffering from a famine of woods suitable for aircraft, but particularly of silver spruce, and this famine is due as much to transport troubles as to the wastage inherent to aircraft manufacture. The rapid depreciation of service airplanes further contributes to render this problem a serious one.

To overcome these difficulties, which might eventually hamper aircraft supply, a British lumber concern has recently placed on the market hollow spars which are built up of thin veneers glued together to any desired section, strength, shape and length. No matter what the length of the desired spar may be, no scarfing or other joint is required, and uniform strength is given the spars over the entire length.

The same method is adopted for building up engine bearers and streamlined struts for interplane connection and undercarriages. These struts and spars are all reinforced in their interior construction in such a way as to give the greatest resistance to all stresses and strains without adding to the weight of the pieces.—*The Aeroplane* (London), 30/1.

THE ENGINES OF THE ZEPPELIN AND THE GOTHA.—Through the courtesy of the air board we are enabled to publish in what follows full particulars and illustrations of the "Maybach" motor, as used by the Germans in their Zeppelin airships, and of the "Mercedès" engine, as used by them in their Gotha aeroplanes. The information relating to the Maybach engine has been derived from a study of the motors of the German airship *S. L. 11* that was brought down in flames at Cuffley on September 3, 1916, by Lieut. W. L. Robinson, V. C. That that airship was of the Schütte-Lanz type and not a Zeppelin is, of course, now an accepted fact, but its Maybach engines were identical with those in use, or until recently in use, in Zeppelins. To what extent the design of these engines has since been altered we are unable to say. The Mercedès engine described is one of two recovered from the wreck of a three-seater Gotha biplane of the pusher type, brought down in Flanders last April.

The Maybach Engines of the Airship "S. L. 11."—Airship *S. L. 11* carried four independent "Maybach" engines arranged probably in four gondolas, one forward, one astern, and two abreast, amidships. Each drove an 18-foot two-bladed propeller, had six vertical water-cooled cylinders and developed, it is believed, about 200 brake horsepower at 1200 revolutions. Three of the engines were exactly similar in construction. The fourth was of the opposite hand, revolved in the opposite direction and probably drove the midship starboard propeller. Power was transmitted from the engines to the propellers through multiple plate clutches and reduction gear boxes. All four sets of reduction gearing were fitted with hand-operated band brakes, and two were provided with reversing mechanism. Parallel gearing was employed throughout the drive in the *S. L. 11* airship. In Zeppelin airships the propellers are carried in overhead brackets fixed to the hull framework, and are driven by bevel gearing and diagonal shafts.

The Cylinders.—The cylinders have a bore of 150 mm. and a stroke of 190 mm. The compression ratio is believed to be in the neighborhood of 6 to 1. Each separate cylinder—see Fig. 1—consists of a steel barrel or sleeve screwed at the top end into a cast-iron head piece containing the valves and extending downwards to form the water-jacket. The joint

at the lower end of the jacket is made by means of packing material—possibly rubber-covered copper wire—wound in a rectangular groove turned on the cylinder barrel. On the barrel being screwed into the head casting the mouth of the jacket passes over the upper flange of the turned groove and beds down on the packing material supported on the lower flange. In a spare cylinder carried by the airship the construction was slightly different, a plain joint being made in the cylinder head and a

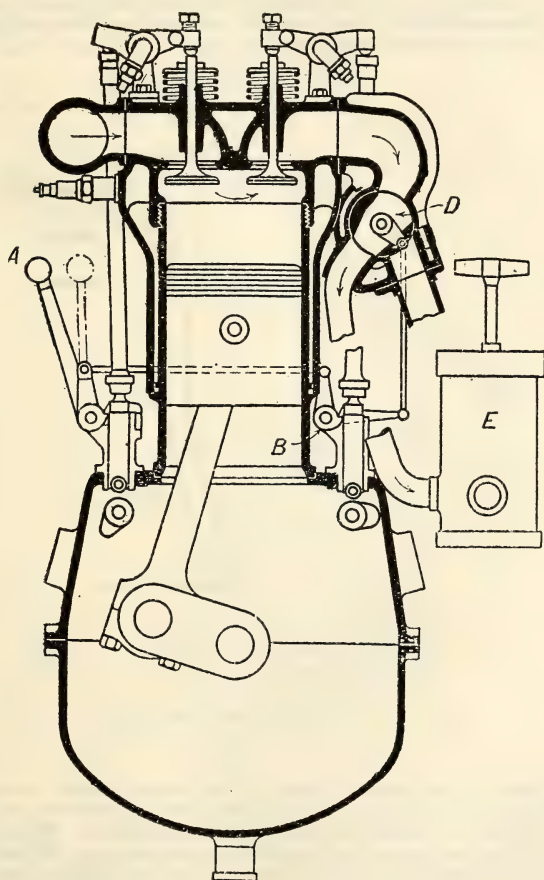


FIG. 1.—Cross-Section of Engine.

large union nut being employed to couple the foot of the jacket to the barrel.

The large circular joint in the head casting, shown facing the reader in the photograph of the wrecked engine reproduced in Fig. 19, establishes communication between the water-jacket and the jacket of the adjacent cylinder. The gap between the two adjacent flanges is not more than 10 mm. wide, and is filled up by a rubber and wire ring of approximately

square section surrounded by a band clip of sheet brass—see Fig. 2. When this clip is tightened up the rubber ring is contracted radially, and therefore forced to expand sideways, and so to make a water-tight joint between the two jackets.

Cooling Arrangements.—The circulation of water in the jackets is believed to be achieved by means of a thermo-syphon system working in conjunction with a large honeycomb radiator for each engine. No indication of the use of a water pump has been found, but it is understood that the thermo-syphon circulation is assisted by an “accelerator”—see Fig. 3—working vertically inside the pipe leading from the radiator to the engine and driven through bevel gearing from the crank shaft at twice

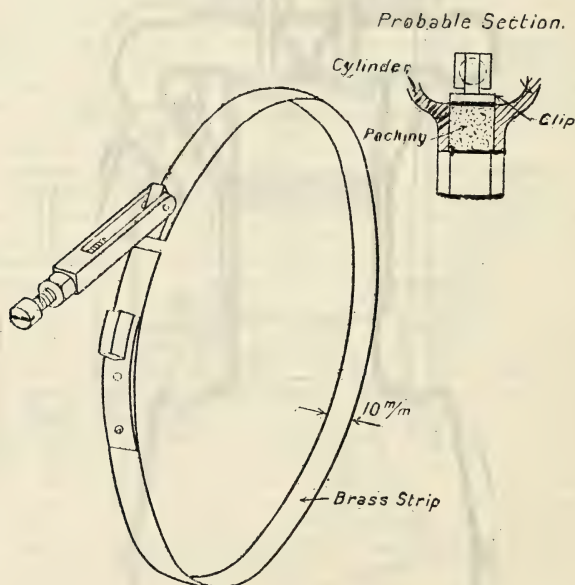


FIG. 2.—Cylinder Water Joint Clip.

the engine speed. The course taken by the cooling water is indicated in Fig. 4. Leaving the radiator and passing the accelerator it enters an aluminium jacket surrounding the front carburettor. This jacket is attached to the water-jacket flange of the front cylinder. Flowing thence through the six-cylinder jackets in turn, the water reaches the jacket of the rear carburettor attached to the water-jacket flange of the rear cylinder. It then flows back through a copper water-jacket surrounding the exhaust manifold pipe, and so returns to the radiator. The object of cooling the exhaust pipe is, we presume, to prevent the starting of an accidental fire—as by the contact of clothing or other inflammable material with it—or the ignition of hydrogen escaping from the envelope.

Considerable precaution is also taken to remove all chance of an explosion in the crank case. To this end, air is drawn into the crank case through six “breathers” of aluminium fixed along one side of the crank case and drawn out through six ports in the opposite side, as shown in

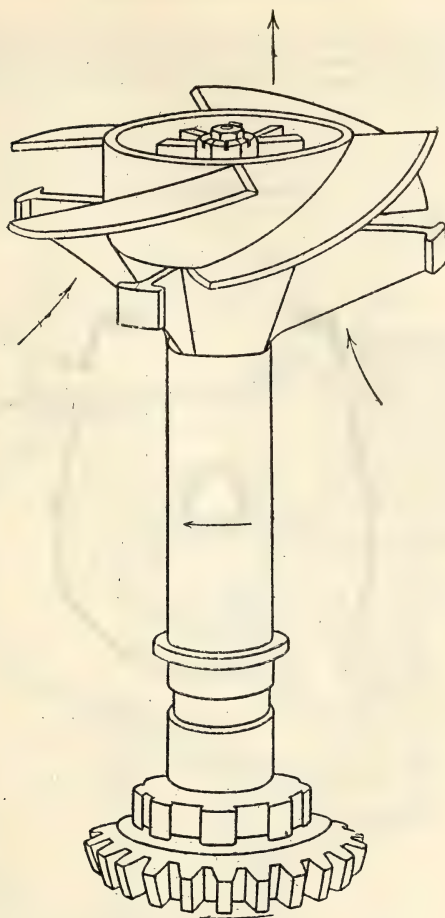


FIG. 3.—Accelerator for Cooling Water.

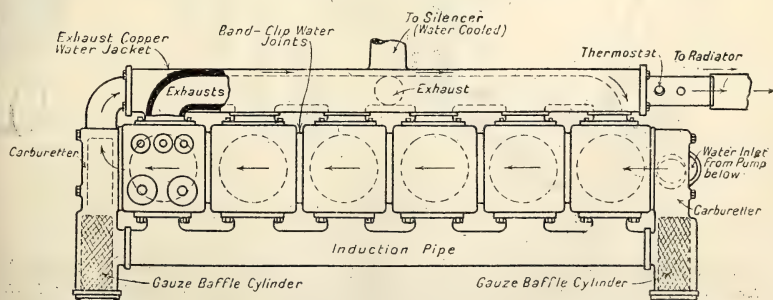


FIG. 4.—Water Circulation Arrangement.

Figs. 5 and 6. The air from the crank case is thus led into a sheet aluminium funnel extending along one side of the engine, and is thence drawn up through a marine-type ventilator projecting through the top of the gondola.

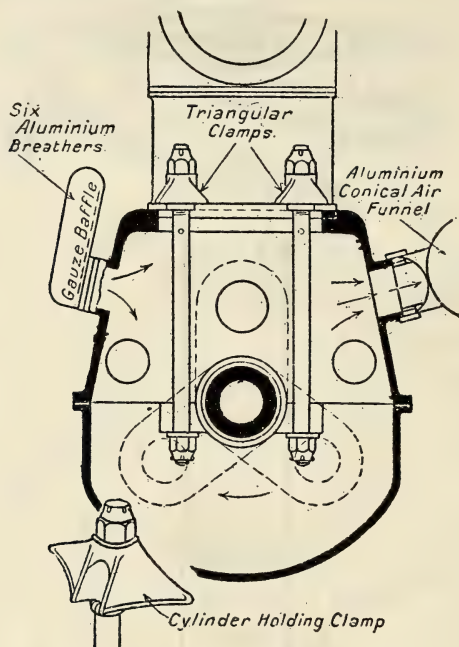


FIG. 5.—Section of Crank Case.

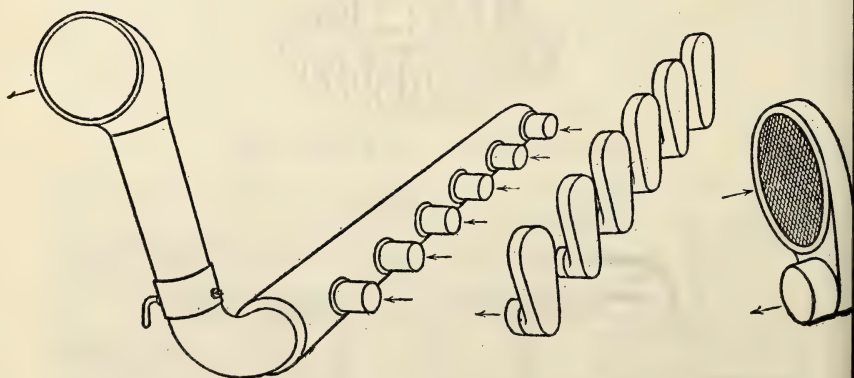


FIG. 6.—Crank Case Ventilating Details.

In passing, it may be noted that Fig. 5 also shows the manner in which the cylinders are secured to the crank case. Each cylinder is held in place by means of four bolts each provided with a triangular clamp

and nut at its upper end. The bolts pass downwards through holes in the webs of the upper half of the crank case and are thus made to hold in place the caps—inverted—of the crank shaft main bearings. In this way the material of the crank case is freed from the action of the tensile force existing during the explosion stroke between the cylinder and the crank shaft. The bolts are flanged near their upper ends, so that the crank shaft bearing cap is not disturbed when the cylinder is removed.

The Carburetters.—As has already been indicated, each engine is fitted with a carburetter at each end, the two carburetters being provided with

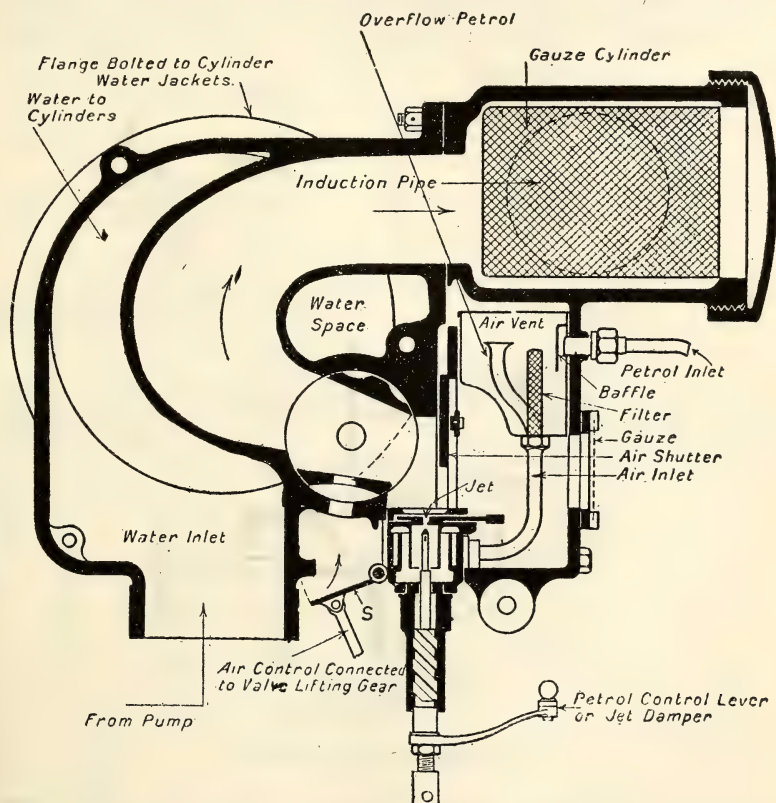


FIG. 7.—Carburetter.

jackets through which the cooling water flows, in the one case, on the way to, and, in the other, on the way from, the cylinder jackets. A general sectional arrangement of the type of carburetter used is given in Fig. 7. The large cylindrical wire-gauze baffle at the end of the induction pipe is presumably intended to complete the breaking up of the mixture and to prevent a back-fire from reaching the carburetter. Fig. 8 is a diagram of the carburetter intended to explain its internal structure, and Fig. 9 illustrates how certain of its parts are interconnected by external levers and links.

The carburetter is provided with a rotary throttle valve opening on one side—the right in Figs. 7 and 8—to a mixing chamber, and on the other, to the inlet pipe. In the lower portion of the valve is a large port registering with a hole in the casing, which hole is controlled by a shutter *S*, for a purpose to be referred to later. The main air supply to the mixing chamber is regulated by a guillotine shutter. The fuel is delivered through a hole in the carburetter casing over which fits a cap in which an eccentric orifice is drilled. By the rotation of the cap the available area of the jet hole can be increased or diminished. As indicated in Fig. 9, the throttle valve, air shutter and jet cap are connected together in such a way that when the throttle valve is moved the air shutter and jet cap move in unison with it. In this way the quality of the mixture is kept constant at

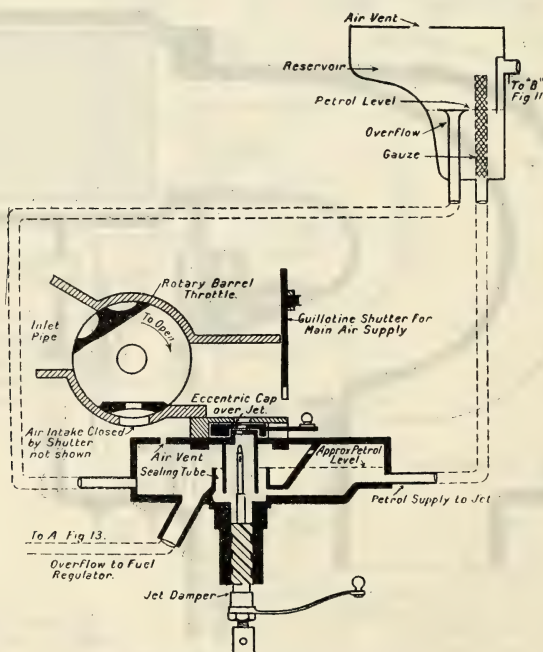


FIG. 8.—Diagram of Carburetter.

any throttle opening by mechanical means. The relative setting of the three interconnected items can be adjusted by altering the lengths of the links and lever arms, as indicated in Fig. 9.

It will be noticed that the usual float chamber is not embodied in the design of the carburetter. The reason for this is that the feed with a float chamber is affected by change of atmospheric pressure. Instead of a float chamber, a reservoir—see Fig. 8—is provided at a short head above the jet hole, into which reservoir petrol is delivered by a pump. Passing through a gauze filter the fuel descends into the jet box, a vessel divided into two chambers by a diagonal wall. At the base of this wall is a passage leading the petrol into a short, wide sealing tube, while at the top of the wall is an air vent opening into the second chamber. A tube open at the lower end and concentric with the jet orifice depends from the top

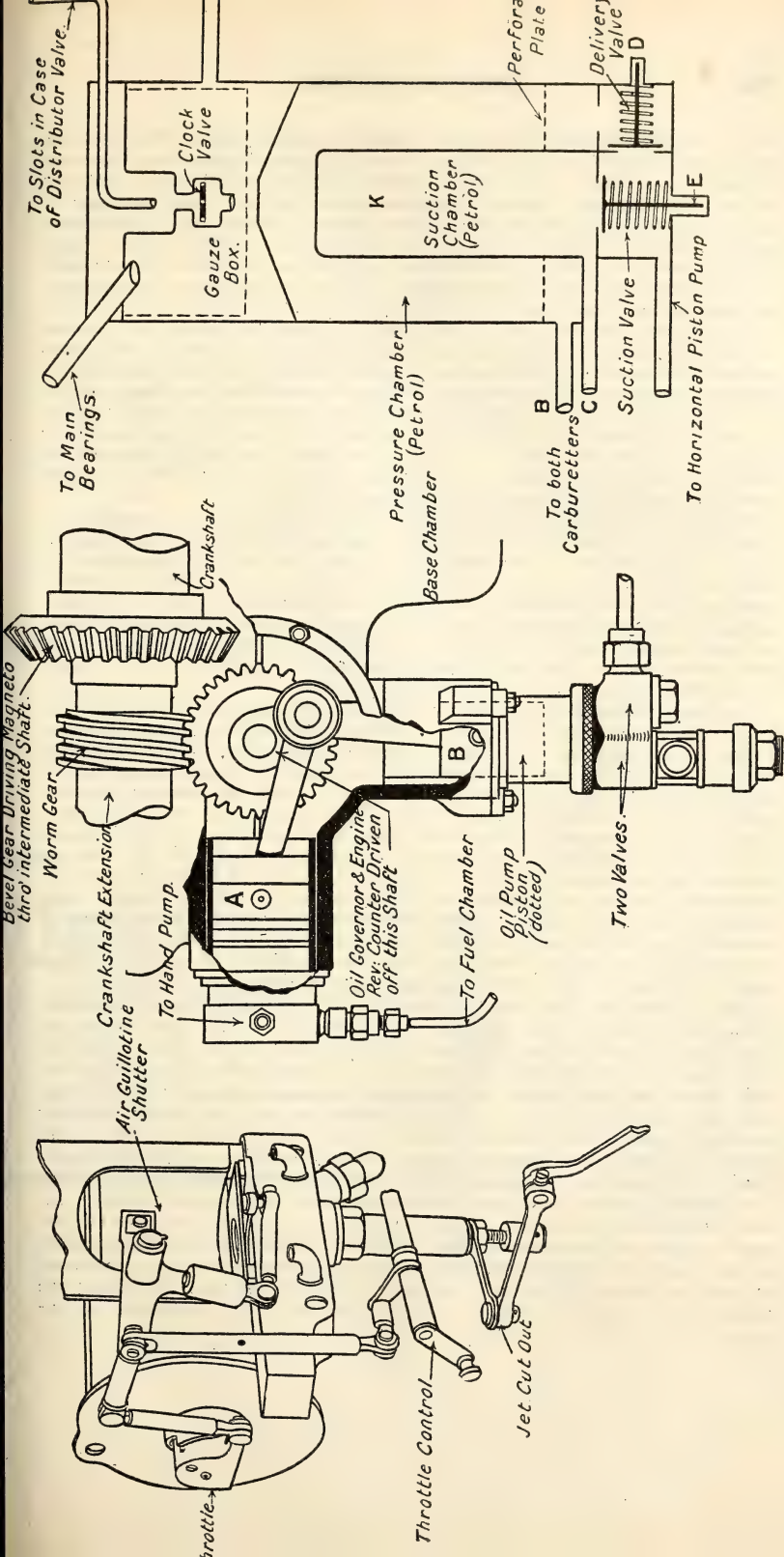


Fig. 9.—Interconnected Levers of the Carburetter.

Fig. 10.—Fuel and Oil Pumps.

Fig. 11.—Diagram of Pressure Equalizer.

of the second chamber to a point within the sealing tube. The level of the petrol in this tube is thus kept constant at the level of the top edge of the sealing tube. Any surplus petrol supplied to the sealing tube in excess of the quantity drawn therefrom by the jet spills over the edge of the sealing tube into the second chamber, where it meets the surplus petrol coming down the overflow pipe from the reservoir, and is thence drawn off to a fuel regulator. The reservoir and the second chamber are both open through vents to the atmosphere, so that variations in atmospheric pressure do not affect the level of the petrol in the jet box.

Fuel Pump.—At the end of the shaft driving the governor a small crank is provided, as shown in Fig. 10, to drive the pistons of two pump cylinders disposed at right angles to each other. The vertical pump *B* supplies lubricating oil under pressure to the main bearings, cam shafts, etc., in a manner to be described. The horizontal pump *A* supplies petrol to the carburetter, but the manner in which it does so can hardly be described as straightforward. Between the pump and the carburetter are two items which, for want of better names, may be called the pressure equalizer and the fuel regulator.

Pressure Equalizer.—A diagram of the fuel supply pressure equalizer is given in Fig. 11, and a sketch of it in section in Fig. 12. This fitting is bolted to the bottom of the crank case at the rear end of the engine. It consists, generally, of a cylindrical vessel divided by an internal conical partition into two chambers. The upper chamber is devoted to the lubricating oil and the lower to the petrol supply system. The two systems are here brought into propinquity, presumably in order simply that the oil may warm, and, in turn, be cooled by the petrol. In each portion a filter is provided for the liquid to which it is devoted.

Leaving reference to the upper portion until later, we note that the lower portion contains an internal chamber *K* provided with an inlet pipe *C* and in communication through a suction valve *E* with the horizontal fuel pump. On the delivery stroke of this pump the petrol drawn out of the chamber *K* is forced through the valve *D* into the annular chamber outside *K* and so through the pipe *B* to the reservoir at the carburetter. This fitting is probably intended to fulfil two functions. If we suppose that the upper portion of the pressure chamber is filled with air, then its presence would make the flow of petrol into the carburetter reservoir continuous instead of intermittent, as it would be if the supply were delivered straight from the pump. Secondly, the fact that this fitting is situated at a little lower level than the pump suggests that the pump is intended to deal with air only, so that the possibility of petrol escaping past its piston into the crank case may be excluded—see Fig. 15.

Fuel Regulator.—The suction chamber *K* of the pressure equalizer draws its supply of fuel through the pipe *C* from the fuel regulator. This device is shown in diagram in Fig. 13, and by the sketch Fig. 14. It consists of a cylindrical tank divided into two chambers, and is carried well below the level of the carburetters. The upper chamber is fed from the main petrol tank, and is in communication with the lower chamber through a central tube that extends well down into the latter. The lower portion of this tube forms a guide for a large float, while its upper portion contains two seatings for a double-ended needle valve which normally is pressed down onto the lower seating by a spiral spring. Inside the tube is a rod which, when the float rises, is raised so as to lift the needle valve onto its upper seating. The rod referred to is in two portions pressed apart by a spring, the idea presumably being to obtain a cushioning or delaying effect. From the chamber in the central pipe containing the needle valve a pipe *C* proceeds, and is believed to be connected to the pipe *C*, Fig. 11.

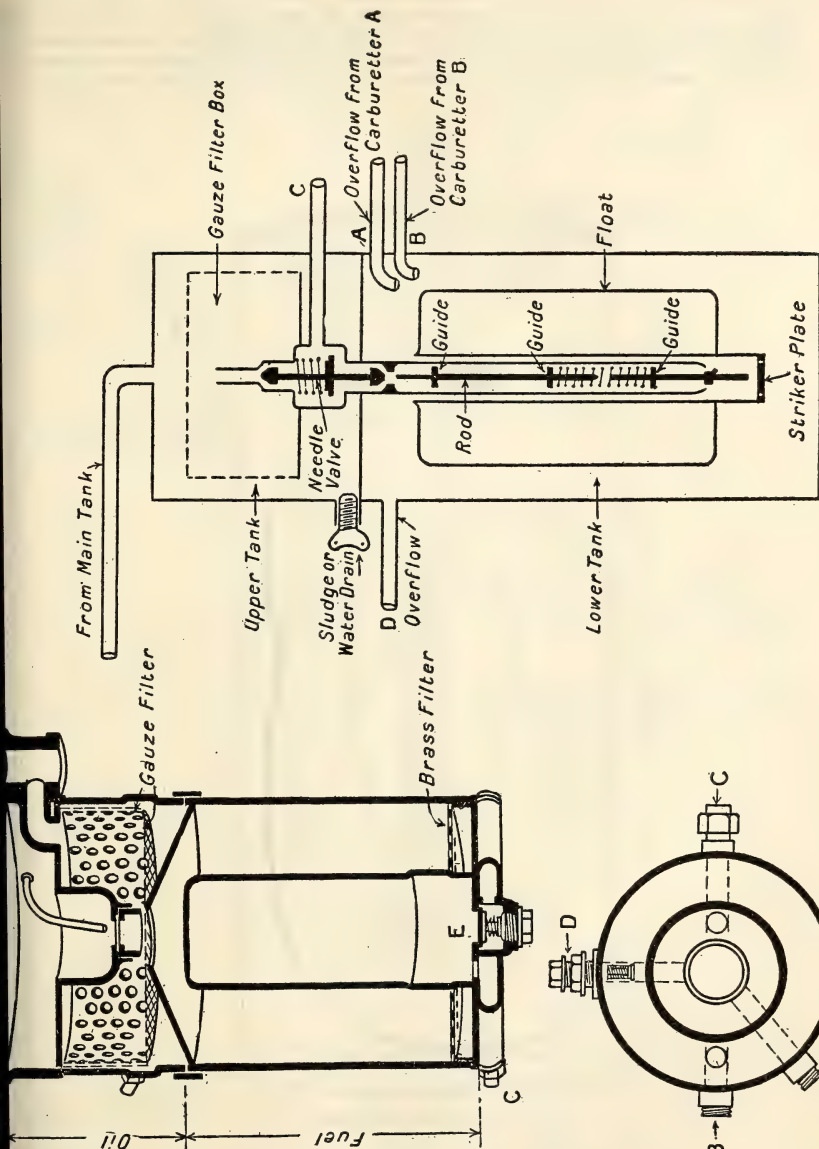


FIG. 12.—Pressure Equalizer.

FIG. 13.—Diagram of Fuel Regulator.

The operation of this device is understood to be as follows: When the pipe *C*, Fig. 11, experiences the suction of the pump, the pipe *C*, Fig. 13, communicates this suction through the needle valve chamber to the upper division of the fuel regulator, so that petrol is drawn over into this division from the main tank and thence through the pipes *C* to the carburetter

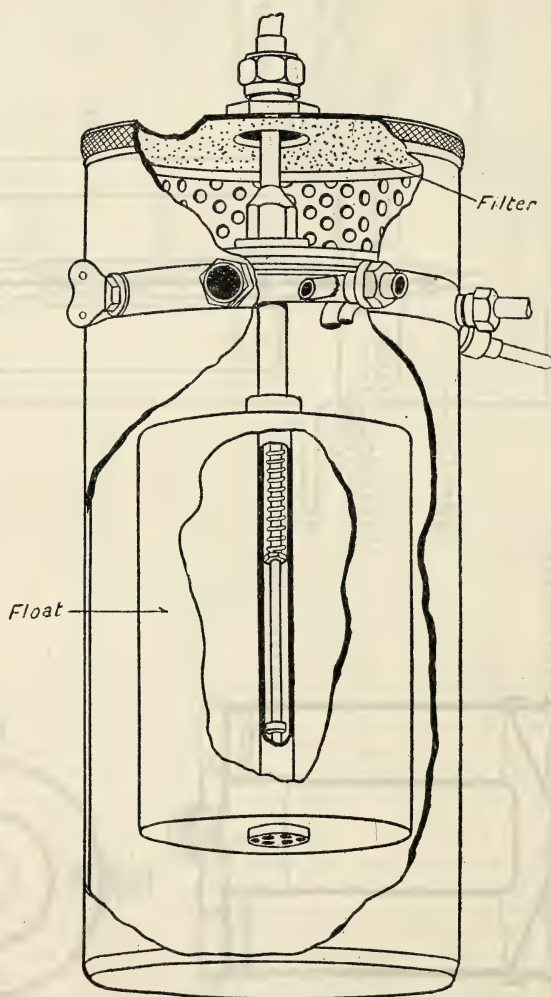


FIG. 14.—Fuel Regulator.

reservoir. The surplus petrol not required by the engine returns from the carburetter in the manner already described, and flows back through the pipe *A* or *B* to the lower compartment of the fuel regulator. When sufficient has thus been admitted to that compartment, the float rises and pushes the needle valve on to its upper seating, so that the suction of the

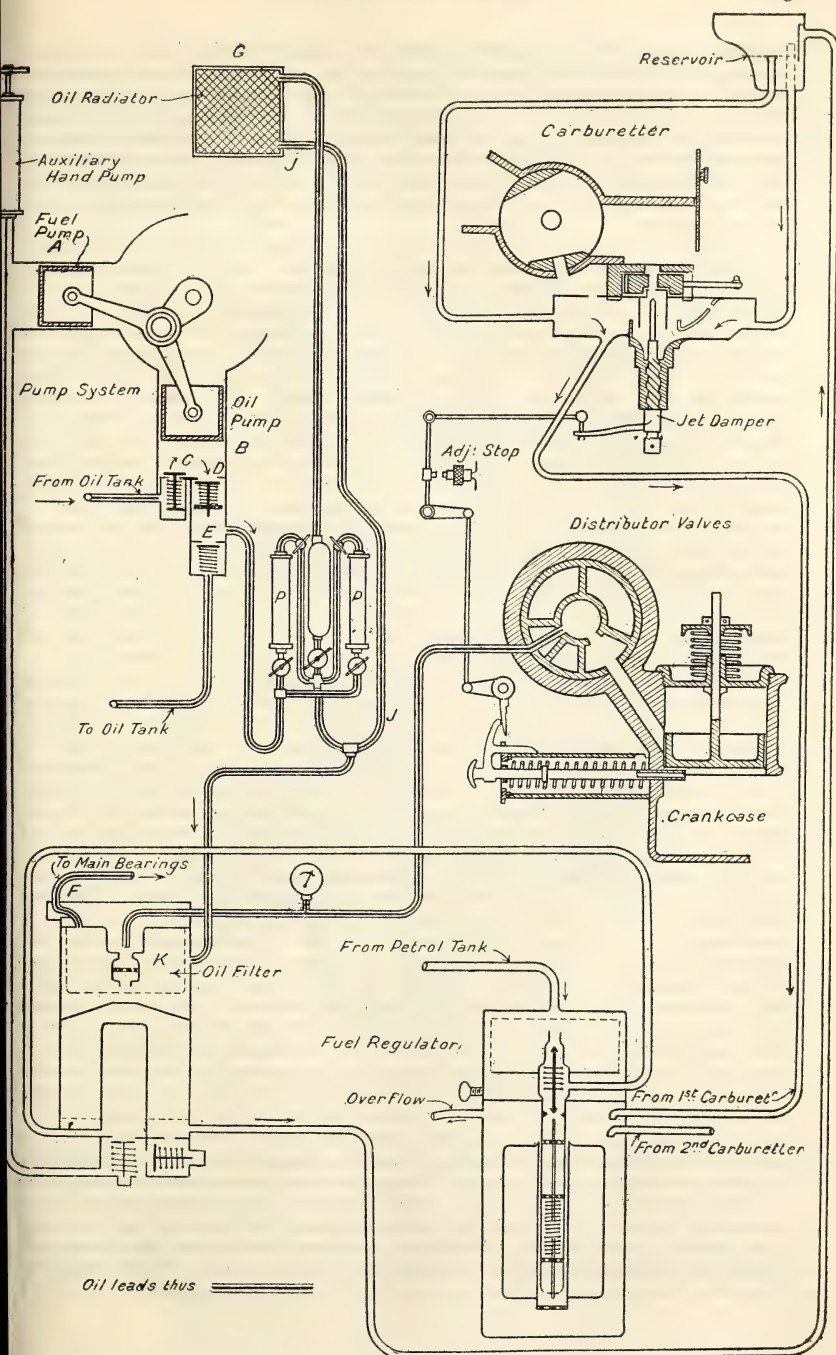


FIG. 15.—Diagram of Petrol and Oil Supply Systems.

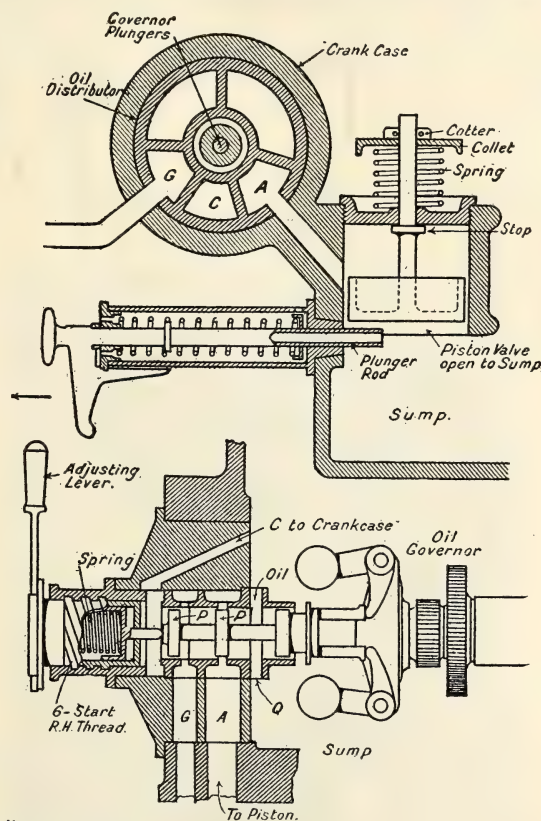
pressure equalizer is transferred from the upper to the lower compartment, until the returned petrol is used up or sufficiently so to permit the float to drop far enough to allow the needle valve to fall and suction from the upper compartment to be resumed. The pipe *D* leading from the float chamber is presumably an air vent which is carried sufficiently high to prevent leakage. It will be gathered, then, that the fuel regulator is rendered necessary by the system of jet feed adopted in the carburetter, and by the necessity for using up any surplus petrol that overflows from the carburetter.

Lubrication System.—The petrol supply system is further complicated by being interconnected with the engine governor and the lubricating oil system in such a way that the engine is automatically shut down if (1) the speed rises above a certain permissible maximum, and if (2) the lubricating oil supply should fail. Before explaining the means employed to achieve these results, we will describe the general lubricating system adopted. The system is illustrated in Fig. 15, a diagram which also illustrates the interconnection of the carburetter with the pressure equalizer and fuel regulator and with the lubrication system. The oil pump *B*—already referred to in connection with Fig. 10—draws its supply of oil from the service tank through the valve *C* and delivers it past the valve *D* to two oil filters *P*. Any surplus oil not required in the bearings is returned past the pressure relief valve *E* to the service tank. Leaving the filters *P* the oil is sent through a radiator *G* outside the gondola in order to cool it, and thence flows through the pipe *J* to the upper filter chamber in the pressure equalizer already described. From this it passes to the bearings and thence into the sump of the crank case, from which it drains into the service tank situated below. It is clear from the valves on the filters *P* that the radiator *G* can, if necessary, be cut out of action, as can either of the filters *P*, while the engine is running, so that it may be cleaned.

Connection Between Petrol Supply and Lubrication System.—Should the pressure of oil in the lubrication system fail, means, as we have already said, are provided whereby the engine is automatically shut down. These means act by closing down the petrol supply, and are illustrated in Fig. 15, and to a larger scale in Fig. 16. Beneath the jet orifice in the carburetter is a damper consisting of a pointed rod on which is formed a quick-thread screw. This damper is operated through a system of bell crank levers and links by a spring-pressed plunger in such a way that the jet orifice is closed when the plunger is as far over to the right—as shown in the diagrams—as possible. Within the crank case is a short cylinder containing a plunger that is constantly pressed upwards by a spring. Behind this plunger the pressure of the lubricating oil is admitted by means of a pipe reaching from the upper chamber of the pressure equalizer to the plunger cylinder. To start the engine the horizontal plunger rod operating the jet damper has to be held over to the left by hand or foot power until the pressure of the lubricating oil is sufficient to move the plunger piston downwards against the force of the spring. With the plunger piston in this position the plunger rod will remain over towards the left, and therefore the jet damper will remain out of action unless the pressure of the oil supply falls, in which event the plunger piston will rise, the plunger rod will move to the right and the damper will close the jet orifice.

Connection between Petrol Supply and Governor.—The pipe referred to in the above sub-section as leading from the upper chamber of the pressure equalizer to the plunger cylinder within the crank case admits the oil to the cylinder through a distributing valve, which is under the control of a governor, in such a way that the plunger piston will rise and so interrupt the supply of fuel to the carburetter not only should the lubricating oil supply fail, but also should the speed of the engine exceed a fixed maximum. The distributing valve has two ports *A G*—Fig. 16—controlled by a pair of

pistons *P* on a rod that at one end is acted upon by the governor levers and at the other by a spring plunger, the force of which can be adjusted. At normal speeds the pistons *P P* are in such a position that the oil from the pressure equalizer has a clear passage through the ports *G* and *A* to the plunger piston in the crank case. If the speed rises beyond a predetermined amount, the governor will move the pistons *P P* over to the left against the action of their spring, so cutting off the port *A* from the port *G*, opening



"THE ENGINEER"

FIG. 16.—Oil Pressure Distributing Valve.

the port *A* to the crank case interior through the port *Q*, and allowing the oil behind the plunger piston to drain into the crank case and bringing about the closure of the jet damper. The port *C*, it is surmised, is intended to prevent a dash-pot action.

Engine Starting Mechanism.—The cross-section, Fig. 1, illustrates the means adopted for starting the engine. By operating the handle *A* all the valve tappet rods—those for the inlet valves on one side and those for the exhaust valves on the other—can be lifted off their cams simultaneously, so

that all the valves can be held open. Fig. 17 indicates how this result is produced. The handle *A*, Fig. 1, operates, on each side of the engine, a shaft on which lips are formed to catch under small projections on the sides of the valve tappets. The movement of the handle *A* also partially rotates the barrel valve *D*, Fig. 1, in the exhaust manifold, thus closing the exhaust passage to the silencer and opening it to a secondary outlet pipe leading to a large suction hand-pump *E*. All the valves being open, the operation of this hand-pump draws in gaseous mixture into the cylinders from the two carburetters. The handle *A* is then moved to restore the

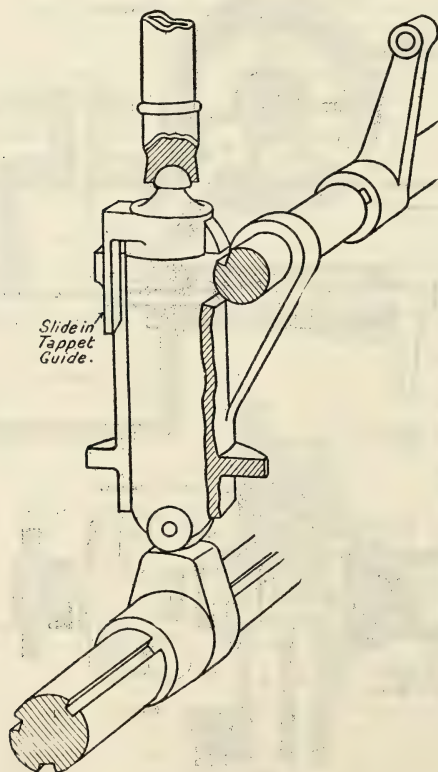


FIG. 17.—Valve Lifting Gear.

inlet and exhaust valves and the valve *D* to their normal setting, whereafter ignition is caused in those cylinders that are just over the compression stroke by means of a geared-up Bosch hand-starting magneto. The shutter *S*, Fig. 7, on the carburetter casing is connected with the valve lifting gear, so that additional air may be admitted to the cylinders when the engine is being started.

Ignition.—Ignition is normally effected by means of two Bosch magnetos driven by bevel gearing off the crank shaft. Two Bosch sparking plugs are fitted to each cylinder, one on each side of the combustion chamber directly below the valves.

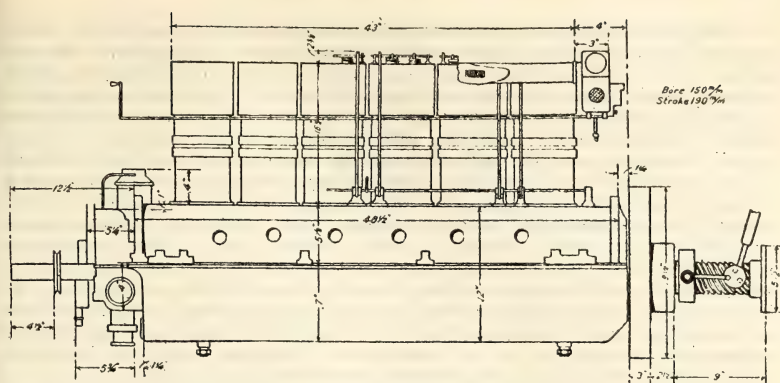


FIG. 18.—Leading Dimensions of Maybach Engine from German Airship *S. L. 11*.

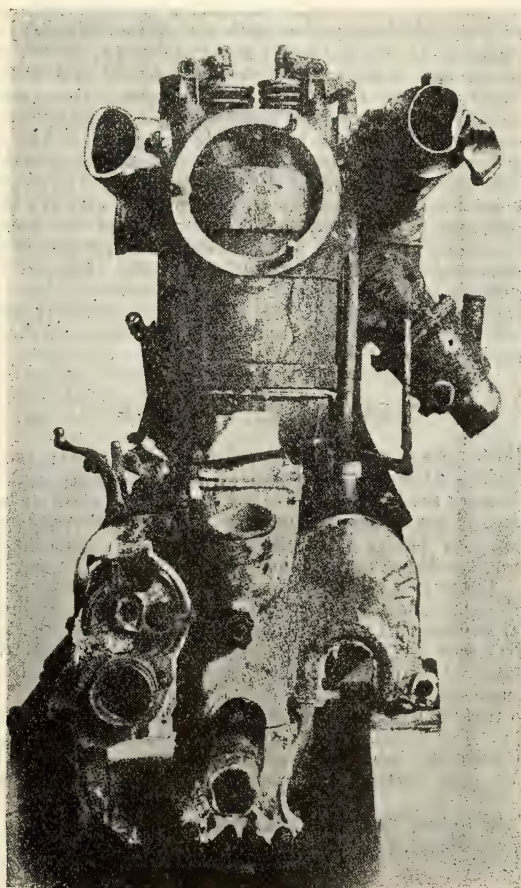


FIG. 19.—Wrecked Maybach Engine.

Valves and Valve Gear.—Each cylinder has five valves—two inlet valves, 53 mm. in diameter, and three outlet valves, 41 mm. in diameter. All the valves are of the overhead type and work vertically in the water-cooled cylinder head. They are operated by rocker arms. The three rocker arms for the exhaust valves and the pair for the inlet valves are in each case formed from a single stamping and work on hollow spindles. These spindles are separate for each cylinder, but are coupled together by short pieces of rubber tubes and clips. The rockers are lubricated by oil passed through the hollow spindles, the flow being from the main oil supply, through the spindles of the inlet valves, back along the exhaust valve spindles into the sump. Each set of two, or three, rocker arms is operated by a tubular push rod with a spherical joint at each end. Adjustment of the valves is obtained by means of the screws at the end of the rocker arms. It will be noticed from Fig. 1 that the single-coil springs with which the valves are fitted are exceptionally short. The valve tappets are operated by a cam shaft on each side of the crank shaft. The cam shafts are driven by gearing inside the crank case at the fly-wheel end.

Miscellaneous.—The leading dimensions of the engine are given in Fig. 18. The six-throw crank shaft has seven plain bearings each 66 mm. in diameter. The crank pins have the same diameter as the journals. A 36 mm. hole is bored through each crank pin and a 40 mm. hole through the journals. The crank shaft, complete with the pinion driving the cam shaft and the bevel gearing driving the water accelerator, etc., weighs $99\frac{1}{4}$ pounds.

The pistons, of cast iron, each have three rings, and with rings and gudgeon pin each weighs 10 pounds $13\frac{1}{2}$ ounces. The gudgeon pin is 38 mm. in diameter and is locked in place by a set-screw screwed vertically upwards through the pin and its boss inside the piston. The set-screw in turn is locked by a split pin driven through its upper end where this end projects into the hollow interior of the gudgeon pin. The connecting-rods are of square section, measuring 33 mm. each way, and are bored up the center with a 26 mm. diameter hole. At the center of this hole an 11 mm. pipe is fixed to convey lubricating oil from the crank pin end to the gudgeon pin. The connecting-rods each weigh $10\frac{3}{4}$ pounds, while the total weight of the reciprocating parts per cylinder is $14\frac{3}{4}$ pounds.

The fly-wheel is a steel casting $19\frac{1}{2}$ inches in diameter and weighing 67 pounds, and is connected to a multiple disc clutch of the Hele-Shaw type.—*The Engineer*, 22/2.

MERCHANT MARINE

SHIPPING BOARD ANNOUNCES BUILDERS MAY USE SMALLER TIMBERS IN SOUTHERN YARDS.—Double production of wooden ships during the next six months, through modification of plans and co-operation of builders with the government, is the program announced by the shipping board. That southern yards may speed work, they will be permitted to use smaller timbers than originally specified and which still will be required on the Pacific coast. There is a serious scarcity of the large timbers in the south.

Following the announcement of this modification in plans, James O. Heyworth, general manager of the division of wooden ship construction, made public a letter which he had sent to all builders of wooden ships, calling for new methods of building by which more men can be employed simultaneously on each ship.

"This is no time to work on the old basis for wooden ship construction," the letter said: "The country needs ships more than anything else. We must have them. Production must be speeded up. Real co-operation between the shipbuilders of each district can double our production in the next six months."

Surveys of the timber resources available for shipbuilding are being made on the Pacific coast and will be commenced in the south at once by John H.

Kirby of Houston, Tex. Through these inquiries the shipping board expects to eliminate the delays due to inaccurate estimates by lumbermen of what they can produce.

The order permitting the use of smaller timbers follows urgent protests from southern pine growers, who have contended that they have plenty of lumber of sufficient size, and that the board's insistence upon the big timbers required by the original specifications for the Ferris type was unnecessarily holding up the building program.

Mr. Heyworth's letter called attention to the wide difference in the number of men employed on a ship at one time by different yards. While some yards work 400 men, others work as few as 125, progress being correspondingly slow.

"In the Ferris standard type ship," the letter said, "the plans are so accurate that much of the woodwork can be done with safety by sawing to the exact dimensions. We have records of yards where they have put as high as 500 men on a ship to advantage. In one yard, this has recently caught up previous delay by over two months."

Architects of the shipping board are now engaged in designing a modified Ferris type ship, contracts for 150 of which will be awarded to gulf coast builders as soon as ways are available. Southern pine manufacturers, in conference with officials of the board, pledged the industry to produce timbers for at least 300 of the modified Ferris ships a year, in addition to schedules on which the mills are now working.

Representatives of the Southern Pine Association said the change promises to speed up the building program tremendously.—*Washington Evening Star*, 14/3.

NON-SINKABLE "LUCIA" MAY FAIL OF APPROVAL.—Naval experts anticipate an unfavorable report from the board, headed by Rear Admiral Albert G. Winterhalter, which has just completed tests of the former Austrian steamer *Lucia*. That vessel has been equipped with interior "buoyancy boxes" designed to make her unsinkable.

That the ship will remain afloat after receiving injuries which would sink a craft of ordinary construction is conceded. Constructors are, however, of opinion that the "buoyancy boxes" would not prevent a torpedo damaging the vessel to such an extent that she would be of no further value as a supply ship or cargo carrier. In taking that position naval engineers indorse the decision already reached by the shipping board.

Proponents of the "buoyancy box" idea are expected to press for its adoption in case of army transports, holding that even if the vessel when torpedoed settled until her decks are awash, the lives of most of those on board still would be protected. It is not believed, however, that this advantage will impress navy constructors sufficiently to win their indorsement.

The Winterhalter board is now preparing its official report for Secretary Daniels.—*Evening Star*, 12/3.

CONCRETE SHIPS MAY BE SOLUTION OF PROBLEM.—Concrete ships are claiming a large share of public attention and of the attention of officials of the shipping board. Both the public and officials see in them a possible solution of the shipping problem—solution of which through the building of steel and wooden vessels is a steadily diminishing hope.

This interest has been heightened by the launching recently on the Pacific coast of a 5000-ton concrete vessel, built for private owners. The shipping board has authorized three concrete vessels of 3500 tons each, but successful launching of the larger ship claimed instant attention.

Chairman Hurley telegraphed the builders of the big hull, asking them to report at once what the prospects were for construction of additional vessels and what time would be required. An unofficial report said the launching had strengthened belief that concrete construction could be depended upon.

Chairman Hurley's telegram requested also that there should be an early test of the vessel to settle the question as to her strength and behavior in a heavy sea. An important point to be decided before large-scale construction of concrete ships will be approved by the government is what will be the effect of salt water on the concrete and the steel reinforcement.

Designs for the four 3500-ton concrete ships authorized by the shipping board have been about completed and their construction is to begin soon.—*Washington Evening Star*, 16/3.

UNSINKABLE MERCANTILE SHIPS.—To the ordinary peace-time circumstances under which ships were most usually lost—that is, by collision or by running ashore—there have, in the last three years, been added the extraordinary risks of fatal damage by mine or torpedo. In the course of the first year or two of war this danger was regarded as so abnormal that comparatively little notice was attracted to the sinking of merchant vessels, but during the last 12 months the losses in the mercantile marine have grown to such ominous proportions that it is hardly surprising to find in many quarters the old, old cry for unsinkable ships revived. Prior to the introduction of iron for shipbuilding comparatively little was heard of such a demand. A wooden battleship or frigate would float after a most merciless hammering, for the majority of the damage was inflicted on her upper structure; whilst a wooden ship that ran ashore was hardly ever expected to survive. But with the introduction of iron, and the rapid development of knowledge of naval architecture which accompanied it, the problem of the unsinkable ship came rapidly to the forefront. It has not yet been solved in practice, in spite of the frequently recurring claims that such a vessel has been produced. Probably the loss of the *Titanic*, owing to an accident of an unparalleled nature, did more towards raising doubts as to the invulnerability of even the most carefully constructed vessel, than has any other accident at sea. Everything that could reasonably be done by the builders had been done with the intention of securing flotability, but as the result of an extraordinary collision the vessel sank in four hours. All the experience gained through the loss of the *Titanic* was directed towards rendering her larger successor—the *Britannic*—immune from similar danger, but even the improvements introduced into her did not prevent her loss by torpedo from a German submarine. One may well ask therefore whether it is really possible to build an unsinkable ship.

The answer must undoubtedly be that, with our present knowledge of naval construction, and with the materials that we have at our command, it is possible to do so, but that such a vessel would hardly come into the category of practical ships, and that, even with such a prohibitive reservation, the safety would still be dependent on the human element. Relative safety is quite another matter, and modern scantlings and subdivision are laid down or legislated for on the basis of a vast fund of experience. The columns of the scientific societies bristle with claims and designs for so-called "unsinkable" ships, but acts of God or the malice of the king's enemies are seldom considered by their authors. No question of subdivision or structural strength, for instance, will ever eradicate the ever possible risk of fire on board, and though nowadays such an accident is of the rarest occurrence it is perhaps the most cogent practical argument for loading the upper decks of passenger vessels with boats and life rafts capable of holding every person on board. Against the extraordinary risk of torpedoes it is hardly worth while increasing protection over and above the existing arrangements, but even if they were increased it is impossible to conceive, within reason, a form of construction that would withstand the explosion from a torpedo of a greater size or capacity than those now in use. Increasing a 21-inch weapon to 27-inch or 30-inch would enable an enormously greater charge to be carried, and it is quite impossible to see how any ship could withstand it. Herein must inevitably be found the answer to the battleship with armored submerged surfaces so often put

forward. The only really practicable method of securing a greater degree of flotability than exists at present is by increasing the amount of subdivision. Mere increase of scantlings would absolutely fail to produce any better result, but if the two methods are combined a certain degree of superiority would possibly be attained at the overwhelming disadvantage of additional weight and cost of hull, reduced cargo capacity, greater difficulty of loading and unloading, and many other disadvantages depending on the design and dimensions of the vessel it is proposed to improve. Even if strength and increased cellular construction be adopted, it is extremely doubtful if the additional flotability secured would be more than sufficient to delay the foundering of a vessel struck by a torpedo. The grave difficulty in the way of further subdivision lies in the arrangements required in the machinery spaces. Longitudinal subdivision is almost essential if any greater degree is to be provided, and it would generally interfere very seriously with the positions of boilers. In the majority of mercantile vessels the boilers occupy the whole available width of the stokeholds, which usually stretch from side to side of the vessel. To add side longitudinal bulkheads, even if the side compartments were utilized for coal storage, would involve a prohibitive lengthening of the boiler rooms to accommodate the number of boilers required, and we have already seen in the cases of the *Lusitania* and *Britannic* that even this precaution is insufficient. External excrescences on the side of a ship are often suggested. They add greatly to the resistance, cause serious inconvenience when docking, even if they do not entirely prevent the use of certain dry docks or harbor entrances, and unless they form an integral and fixed portion of the structure, are liable to damage at sea. The use of torpedo nets is unsuitable, on account of the facts that they reduce the speed of a ship, and that in the merchant service crews are not carried in sufficient quantity to enable them to be handled with the requisite facility. Much increase in subdivision renders the conveyance of cargoes, such as locomotives, steel rails, or similar items requiring length or bulk in the holds, a matter of considerable difficulty. Moreover, any considerable increase in number of spaces greatly augment the amount of space wasted, as equally close storage cannot be obtained under the circumstances.

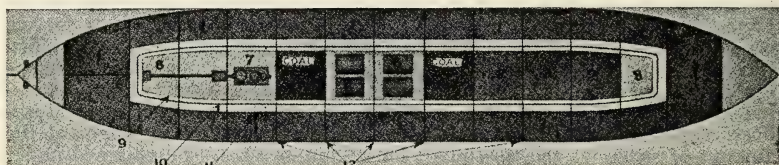
The fact is that the problem of the unsinkable ship is a most unprofitable one from the practical point of view. The Bulkhead Committee, which was sitting before the war, went as far as it was reasonably possible to do, having all the facts based on experience to guide it, and beyond limiting the relative sizes of compartments, and the height and strength of bulkheads, it recommended nothing which could by any stretch of imagination be twisted into a plea for unsinkability. Its provisions took into account all the risks of the sea experienced during peace-time conditions, and did not legislate for mines or torpedoes, particularly when used in defiance of international law. The true remedy in this case is not to alter the vessel at all, but, as far as possible, to see that the risks incurred are a minimum; in other words, to prevent the damage being done, and not to attempt to adopt doubtful methods to palliate their effects.—*Engineer*, 1/2.

A SHIP WITHIN A SHIP.—The Italian merchant marine is not sufficiently numerous to withstand many losses without suffering a very serious diminution. Not long ago a hostile submarine sent the *Milazzo* of 11,477 tons gross to the bottom. The ship was put in service as recently as 1916, and marked a notable departure in bulk cargo freighters. Similarly, a U-boat, a short while back, sent to her grave the *San Guglielmo*, of 8341 tons gross, of the well-known Sicula-Americana Line. Thus the enemy under-water craft have been making dire inroads upon Italy's ships of commerce. It is, therefore, easy to realize just why the government appointed a special committee to consider plans for types of ocean-going merchantmen better able to withstand torpedo attack.

It has recently been announced that this committee has concluded its work after deciding upon a design capable of meeting the specified requirements and susceptible of speedy construction upon standardized lines. Just what the nature of this type is has not been disclosed, but, in all likelihood, it is probably that developed by Naval Constructor Umberto Pugliese, which occasioned a great deal of favorable comment in Italian technical journals a few months ago. Accordingly the following particulars about the Pugliese anti-submarine freighter should be of present interest.

The whole problem of how best to neutralize the ravages of the U-boat has been investigated at some length both here and abroad, and the plans offered may be broadly divided into two classes. The first involved protective features that curtailed the cargo-carrying capacity, while the second, because of greater speed of construction and comparative simplicity of design, promised more numerous fleets, able to transport full cargoes, and thus offsetting by numbers the net sacrifices. In other words, the first class, although damaged, would probably be able to make port; those of the second class, being without structural defence, would in all likelihood sink if hit, but enough of them would get through to strike a fair average in the matter of freight delivered.

Italy, with her limited deposits of iron ore and her dependence in the main upon imported coal, is extremely hampered in the matter of domestic steel, and on that account her designers have sought to meet this situation, now that it is so difficult to obtain structural materials abroad, by evolving a defensive type of merchantman that would in this way minimize the effect



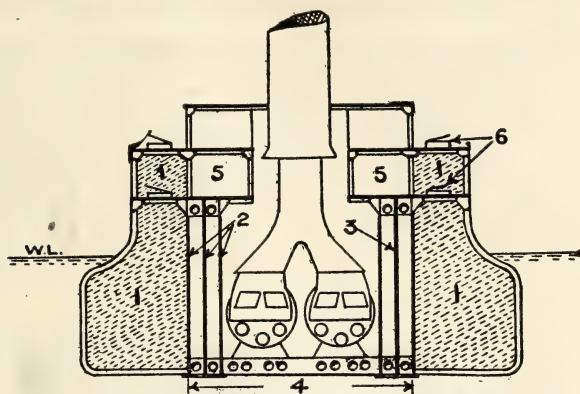
CROSS-SECTIONAL VIEW OF THE DOUBLE-HULLED SHIP.

1. Primary cargo spaces. 2. Longitudinal bulkheads. 3. Principal defensive longitudinal bulkhead. 4. Span of double bottom. 5. Fore-and-aft passage. 6. Cargo hatches and gas vents.

of the foe's submarine activities. In brief, the controlling keynote in the elucidation of the problem for the Italians has been that of most practical conservation. Engineer Pugliese has taken as a basis for his design the familiar cargo type known to the shipping world as the "turret" steamer—really an improved order of the whaleback vessel which originated in the United States in the early "nineties." Internally, however, the Italian naval architect has made changes which he is confident will greatly reduce the menace both of the submarine mine and the automobile torpedo. His plan calls for cargo carriers ranging from 10,000 to 12,000 tons displacement, of 10 to 12 knots, capable of transporting from 4500 to 5500 tons of freight, respectively. The 10,000-ton steamers would be 395 feet long, and when full laden would draw something less than 16.5 feet, as against the 22-foot draft of an ordinary craft of identical displacement. The purpose of this reduced draft is to lessen the chance of a torpedo—set to run at a normal depth of 14 feet—hitting its target and, likewise, reducing the probability of the freighter stumbling upon submarine mines planted at a predetermined depth.

If the torpedo be adjusted to run nearer the surface—say at a depth of 5 feet—its explosive violence would be greatly sapped by the shallower stratum of water lying above the weapon. In other words, the tamping effect of the superposed water would be cut down nearly two-thirds, and

the destructive gases would find a correspondingly easier path of dissipation upward instead of horizontally and inward upon the body of the ship. Engineer Pugliese counts upon the character of the bulk cargo to absorb the shock and to lower rapidly the temperature of the rending gases, and then by suitable vents through the two decks above, to open further channels



PLANE VIEW OF THE DOUBLE-HULLED SHIP.

1, 1, 1. Compartments for the primary stowage of bulk cargo. 2, 2, 2. Secondary freight hold. 6, 6. Boiler rooms. 7. Engine room. 8, 8. Magazines. 9. Inner longitudinal bulkhead. 10. Middle or principal defensive longitudinal bulkhead. 11. Outer longitudinal bulkhead. 12. Athwartship bulkheads.

of escape. It will be noticed that there is no double bottom under the outboard cargo compartments at the points where mines would be most likely to hit. The freight stowed there would, if displaced by the blast, be more freely lifted than disturbed laterally, and, upon this assumption, the superheated gases would find their line of least resistance upward and through the large deck vents, which, in fact, are designed to serve as loading hatches. It will also be observed that the outboard stowage of freight is carried up to the main deck, and this disposition of the bulk cargo provides a potentially effective bulwark against shell attack from the guns of a submarine operating upon the surface. Likewise, the complete athwartships stowage of cargo forward and abaft of the vital area furnishes what is calculated to be a shield against a raking fore-and-aft fire.

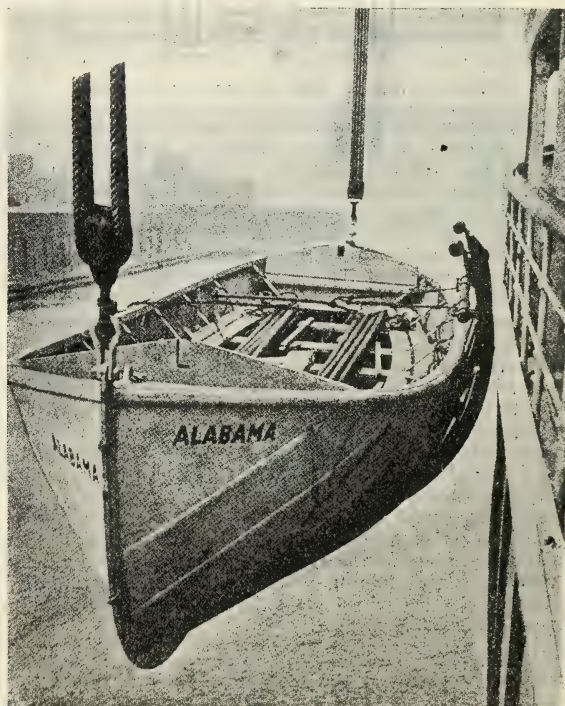
Should, however, either the torpedo or the mine have force enough to spread its destructive work horizontally and athwartships, then the gases will meet a triple defence in the form of three parallel bulkheads, together providing two air spaces having a total width of substantially 53 inches. Inside this barrier are placed the vitals in the shape of boilers, engines, and stores.—*Scientific American*, 23/2.

MISCELLANEOUS NOTES

MAGNETS FOR RAISING SUNKEN SHIPS.—A submarine magnet invented by a Japanese scientist named Nakahara promises, it is stated, to be instrumental in locating many of the sunken submarines, warships, and transports which have gone down in comparatively shallow water. Tests of the magnet over the Japanese naval target grounds recently brought to the surface thousands of projectiles fired in practice. At the present price of scrap iron,

the 60,000 shells which lie scattered at the bottom of the Japanese bays will be worth a small fortune. It is suggested that the magnet should be used in extracting the shell scraps from the soil of the European battlefields. A development of the Nakahara magnet promises to be powerful enough to actually lift sunken vessels from the bottom of the sea. Magnets are now in use on land that will lift upwards of 40,000 pounds.—*Pages Weekly*, 22/2.

NEW SYSTEM OF RAISING VESSELS.—A new system of raising sunken vessels was demonstrated last week, when the 60-ton two-masted barge *Regla* was brought to the surface at Regla, across the harbor from Havana. Four tanks divided into two sections, one section containing acid and the other water, were attached to the hulk by divers. When all was ready a valve in each of the tanks was opened by means of lines, allowing the water in one section to mix with the acid in the other. The gases thus formed expelled the water, converting the tanks into buoys, the lifting power of which was sufficient to bring the craft to the surface and maintain it there. Although only a few feet of one of the masts was visible above the water, the moment the valves were opened the barge began to rise, and within a minute it was floating erect. Officers of the army and navy witnessed the demonstration.—*Nautical Gazette*, 20/12.



THIS LIFE-BOAT CAN BE SAFELY LAUNCHED BECAUSE
OF THE CRADLE ARRANGEMENT.

CONSERVING THE LIFE-BOAT.—The launching of life-boats has always presented a serious problem. There are too many instances of life-boats being dashed to pieces against the side of the sinking vessel to elaborate on this

particular danger, but suffice it to say here that of all the difficulties encountered, perhaps this one is the gravest and by no means the least common.

No one should be better informed in this respect than the president of a navigation company. So it is quite fitting that Mr. J. L. Hyland, president of a steamship line and a resident of Winnipeg, Canada, should have invented a safety device for use in launching life-boats. Mr. Hyland's device, it will be noted in the accompanying illustration, consists merely of a cradle-like arrangement of steel rods and rollers attached to the bottom and side of a life-boat. As the small craft is lowered, the cradle keeps it clear of the ship's side and prevents it from being broken or upset on the rails, guards or uprights. It is said of this device that it assures absolute stability with the vessel at any angle and under any weather conditions. Obviously, when the life-boat reaches the water the cradle can be released by an arrangement of chains and connecting rods.

During a recent demonstration certain U. S. Government officials were present. To all appearances the device serves its purpose well.—*Scientific American*, 9/3.

CURRENT NAVAL AND PROFESSIONAL PAPERS

UNITED STATES

ATLANTIC MONTHLY. **March.**—Political Strategy, by *André Chéradame*. The French and German Theories of War, by *General Palat*.

CENTURY MAGAZINE. **March.**—Freedom of the Seas, by *Ellery C. Stowell*.

NORTH AMERICAN REVIEW. **March.**—Japan and Ships, by *M. Togo*. Russia and the War After the War, by *Charles Johnston*.

GEOGRAPHICAL JOURNAL. **February.**—Standard Time at Sea.

INDUSTRIAL MANAGEMENT. **March.**—Labor Factors in the Shipping Problem, by *R. W. Kelly*.

JOURNAL OF THE FRANKLIN INSTITUTE. **March.**—Ship Propulsion, by *Erik Berg*.

YALE REVIEW. **April.**—The Strategy that Will Win the War, by *Emile Mayer*. The Submarine, by *William O. Stevens*. Scandinavian Neutrality, by *Maurice Francis Egan*. The New Chemical Warfare, by *Julian Steiglitz*.

GREAT BRITAIN

FORTNIGHTLY REVIEW. **February.**—The North Sea and Beyond; the New Situation, by *Archibald Hurd*.

CONTEMPORARY REVIEW. **February.**—Colonial Dependencies: Possession in Trusteeship, by *John H. Harris*. Our Docks and Harbors.

NINETEENTH CENTURY AND AFTER. **February.**—The Plight of Spain, by *Dr. E. J. Dillon*.

CONTINENTAL EUROPE

REVUE DES DEUX MONDES. **February.**—The United States and the Far East, by *M. A. Gerard*.





Photo by Central News Photo Service, N. Y.

BRITISH DUMMY DREADNAUGHTS FOOL THE HUNS.

For seven months a fleet of wooden dreadnaughts fooled the German Admiralty. While the real dreadnaughts were being used as convoys these ships lay at anchor to decoy the German ships from their haven. At last they were successful and the German vessels were lured to Kephala where British destroyers lay in wait to open fire. In the fight which followed, the German flotilla suffered severely. One of the wooden ships was hit and beached to form a breakwater. Photo shows the one ship partly submerged and the other afloat.

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NAVAL WAR NOTES

PREPARED BY

LIEUTENANT W. B. JUPP, U. S. Navy

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STRATEGY

DUMMY SHIPS.—The accompanying illustration shows two of the English fleet of 14 dummy ships which were used to great advantage during the first two years of the war. Old merchant hulls were used for these ships and their upper works rebuilt with wood and canvass to represent various units of the British grand fleet. These ships caused considerable annoyance to the Germans in the North Sea and were in part responsible for drawing the Germans into the Dogger Banks engagement, the Germans believing them to be the patrol they were attempting to evade. Later in the Mediterranean a German submarine passed over a convoy of transports to sink one of these ships representing one of England's new dreadnoughts. The turrets of this ship floated for days in the vicinity showing Germany her mistake.—(Rewritten from *N. Y. Herald*.)

CONVOY SYSTEM A GREAT SUCCESS.—Speaking in the House of Commons recently, Sir Eric Geddes, First Lord of the Admiralty, stated that the convoy system has been greatly developed, and is a real success. Since it was adopted 35,000 ships have been convoyed with very low losses. Additional protection is afforded by the fact that the ships in convoys closely follow the Admiralty instructions.

"On many occasions the enemy has been assisted by negligence. Unless the ship is completely darkened in accordance with the Admiralty orders, night is no help against the submarine. In fact, the slightest visible light is an excellent target. We know this not only from unfortunate sinkings, but from the reports of our own submarine commanders and coast watchers who have observed unconvoyed ships. I appeal to the shipowners and shipmasters to heed three points: First, obey instructions; second, keep a good lookout; third, thoroughly darken the ship.

"One result of the convoy system has been to drive the enemy closer to the shore, thus rendering the open sea safer for navigation. During the first months of the unrestricted submarine war 50 per cent of the losses occurred more than 50 miles from land, and only 21 per cent within 10 miles of the shore. To-day the losses outside the 50-mile line have fallen to 1 per cent, while the losses close to land have risen to 61 per cent.

"This transfer of attacks nearer the coast gives increasing opportunities for attacking the enemy by patrolling surface craft and airplanes, and enables us to save many vessels which would otherwise have been lost. The improved salvage arrangements have made tremendous demands on labor and material. Repairs are to-day occupying more men than new mercantile construction.

"The salving is so efficient that of all British armed ships damaged last year only eight were abandoned."—*Nautical Gazette*, 14/3.

DESCRIBES FAKE U-BOAT.—Fake submarines would seem to be the latest Hun trick, according to an account contained in a letter from Carl B. Stancill, son of Rev. R. W. Stancill.

"We had two submarine scares," says the writer. "Sighted one, but our gunners soon put it to rout before it had a chance to shoot at us.

"A few days later we sighted what we took to be the periscope of a submarine and opened fire on it, but saw it was not a submarine, but a fake periscope with a mine on the bottom of it. But we steered clear, and after we were at a safe distance one of our torpedo-boat destroyers destroyed it."—*Washington Evening Star*, 16/3.

FEARS WILSON'S PLANS MAY YET WIN RUSSIA; GERMAN PAPER WARNS OF DANGER IN THE EAST.—Discussing President Wilson's message to the Russian Soviets, the Berlin *Vossische Zeitung* says:

"The promises that Wilson has made to the Russian people are no guarantee that they will be kept but are an indication that Wilson is in agreement with England and is pursuing a consistent Russian policy.

"We would remind our readers that through former Ambassador Gerard and by various other means Wilson has influenced Germany not to make annexations in the east."

The paper says he has kept to his purpose in order to bring Russia again under Anglo-Saxon influence. It goes on:

"To-day when Germany through her buffer-state policy in the east has endangered Russian sympathy, Wilson sees the moment for the fulfillment of the second half of his program. He adopts an attitude fundamentally opposed to the German eastern policy and is likely to succeed by diplomacy in removing German influence from the border states. At any rate, he intervenes as a supporter of a reunion of all the old Russian territory."

The *Zeitung* remarks that in connection with this it must be remembered that the echoes in which the Anglo-American conception is audible are ever increasing, and the idea is that the eastern peace is not an accomplished fact but must be properly regulated at the general peace conference. The paper admits that it is evident that Russia under the influence of promises such as above will welcome any revision of the Brest-Litovsk peace and may even demand it. It goes on to say that this idea may be realized and that Germany may find that her gains are turned as a weapon against her and that England and America will restore the freedom of these states. It adds:

"Even more is it to be feared that this advantage for which the Entente is willing to sacrifice its whole political position in the world will be wholly or in great part gained, and without a world equivalent.

"It is not yet too late to point to this approaching danger that we have seen coming for a long time. A definite settlement of the border states

to be separated from Russia has not yet been reached, and there still remains the possibility, when the decision is made, to allow freely, and even to advocate, a federation of these states with Russia.

"We are convinced now, as before, that a real majority of their people desire this federation and that from our own political viewpoint it is now a question whether they are to receive freedom from our hands or from Wilson's."

The *Vossische Zeitung* has disapproved the eastern policy of Germany from the beginning.—*N. Y. Times*, 17/3.

TONNAGE LOW WATER MARK PAST.—Last week Washington gave out the inspired statement that the overseas ship tonnage available for the Allies and ourselves had passed the low-water mark. Barring unforeseen occurrences, the upward trend should continue from now on. Among the important factors expected to contribute to this improved outlook are the withdrawal of ships from neutral trades, the speeding up of the release of ships through better unloading facilities in France, and the impressment of coastwise steamers into the transatlantic service. Thus, while the ocean transport situation shows signs of betterment, the relief is expected to come from a reallocation of existing shipping rather than from an increase in the amount of tonnage available. The U-boats are still actively at work and taking a considerable if diminishing toll of shipping. Some time, too, must elapse before the vessels now under construction can be expected to exceed in number those being sunk from month to month. At the moment, the work of the Inter-Allied Shipping Control Committee, in conjunction with the new import and export restrictions, is causing war freight to be moved across the Atlantic more freely than before. Indeed, it is stated that there is just now a plethora of ships at certain ports, and that the inability of our railroads to move freight promptly and as required, of which Food Controller Hoover has been complaining, is compelling vessels to lie idle waiting for their cargoes to arrive at the seaboard.—*Nautical Gazette*, 28/2.

THE SHIP SHORTAGE.—Authoritative statistics place the ship shortage at present at 7,435,894 tons. This is equal to nearly 1500 vessels of 5000 tons each, a tremendous handicap to overcome with the U-boats still keeping up their almost daily sinkings. This estimate is based on the amount of tonnage at the outbreak of the war, which was 42,574,537 gross tons, excluding German and Austrian vessels. Tonnage produced since 1914 and interned shipping seized, less nearly 12,000,000 tons destroyed, leaves the present world's tonnage at about 38,000,000 tons.—*Marine Journal*, 9/3.

BIG PLANS CENTER ABOUT BLACK SEA.—True to their character of conscious or unconscious German agents, the Bolsheviki have concentrated the entire Black Sea fleet (if our information is correct) ready for delivery to the enemy. There is no doubt that it will be secured by the latter, and will constitute a new danger to the Allies. When to the Black Sea fleet have been added certain Turkish elements, now assembled in the Sea of Marmora, the whole naval force will be in a position to sally through the Dardanelles and embarrass the British operations in Palestine.

With the aid of the Jewish inhabitants of Odessa, who number about 50 per cent, Germany hopes to erect Odessa into an independent republic and a free port. She will then use the port for shipping Ukrainian produce and raw materials as well as for her own goods destined for Persia through Batoum and Trezibond.

In the vicinity of Odessa are large Gehban settlements which have existed for 300 years. They number nearly a quarter of a million. Their influence is great. They publish their own newspaper, the *Odessaer Zeitung*, possess half a dozen clubs and two discreetly conducted branches of the German Navy League.

The Odessa Jews are proverbially pro-German. They are anxious that this flourishing center should be excluded from the Ukraine, whose treatment of them has been particularly rigorous. Indeed, the massacres which have occurred have all had their theatre within the new Ukrainian State.

In the harbor at Odessa is now a collection of British, French, Italian, and Roumanian steamships, which have been stationary since Russia declared war on Turkey. Their approximate total tonnage is 100,000 tons, amply sufficient to maintain German trade on the Black Sea. This is the more necessary as Turkey needs great supplies of foodstuffs from the Ukraine.

For the operations in the Black Sea the Germans have hitherto kept eight submarines at Constantinople. These will now be available for the Mediterranean.

Again, at Nicolaëff, near Odessa, are large shipbuilding yards, capable of turning out dreadnoughts. The Germans will build submarines, for which coal and iron exist in the neighborhood.

As to German plans in other parts, it is plain that it envisages the restoration of the monarchy in Great Russia after the Bolshevik have completed their disintegration.

Their loot already is enormous in war stores, machinery, foodstuffs and goods of all sorts. It may be estimated at £400,000,000 (\$2,000,000,000). No wonder the western offensive is off for the moment.—*N. Y. Times*, 17/3.

SUBMARINE SINKINGS (GERMAN UNOFFICIAL REPORT).—There was recently a report from Berne that 23 submarines due home in German ports in the month of December failed to give any account of themselves. But from official sources we have heard nothing which justifies our accepting such pleasant news as reliable. It has not yet been claimed by us that we are sinking submarines faster than the enemy can build them. If so wide and determined an offensive is in preparation, are we equipped to meet it?—*Land and Water*.

TO CRUSH U-BOAT EVIL.—American naval officials appear to be satisfied that the weapons with which they expect to crush finally the submarine menace are forthcoming. Increased numbers of patrol vessels of various types, appliances and devices to make them more effective against underwater craft and the increased skill of navy personnel are among the things upon which they count. It has taken time to devise and build the weapons, but they are beginning to become available now.

This country's real contribution to the naval warfare is about to be felt. With every passing week the strength of the force will grow, for it is embodied in the most extensive construction program ever undertaken for the navy of any power.

The new destroyers and other craft must be added to the patrol fleets gradually as they are completed. Therefore no sudden falling off of tonnage losses is to be expected. It has been stated publicly by high British naval authorities, however, that next August will show beyond question that the U-boats have been overcome. There are officials here who are hopeful that decided results will be apparent before that, perhaps as early as May or June.—*Washington Evening Star*, 8/3.

NAVIES OF ALLIES SINK U-BOATS AS RAPIDLY AS BUILT.—It is now believed in official circles that the climax of the U-boat campaign against shipping is about past. Statistics as to the exact number of submarines sunk last year are withheld, but it is known that during the last six months the number destroyed each month has steadily increased. Officials familiar with the resources and facilities of Germany now are convinced that her output of submarines falls short of the number destroyed. Sir Eric Geddes, First Lord of the British Admiralty, said in the House of Commons that the rate of exaggeration in the German reports of tonnage alleged to have been sunk was increasing steadily. The exaggeration in the second quarter

of the period of unrestricted submarine warfare was twice that of the first quarter. The rates in the third and fourth quarters were three and four times that of the first quarter, and in January four and one-half times the first quarter. In the waters around the British Isles, which had been the enemy's chief field for submarine operations, great success against the U-boats has been achieved recently with the help of American naval forces, said Sir Eric. On the other hand, conditions in the Mediterranean have been more difficult to combat. Losses there accounted for about 30 per cent of merchant ships sunk. The resources for combating the submarine in those waters are less adequate and the successes obtained less satisfactory. It has become increasingly evident, the First Lord went on, that as the resources for combating the submarines improve it will be possible to turn attention more to the Mediterranean. The loss of the world's tonnage for the five months ending with February was 10 per cent less than the loss during the corresponding months of the previous year, he said, although during four months of the latter period unrestricted submarine warfare had not been proclaimed by the enemy. "I have stated," the First Lord continued, "that the curve of losses of merchant shipping continues downward. That statement is as true to-day as when previously made. It is true there have been bad weeks and bad months. February was, in comparison with recent standards, a bad month. But, on the other hand, January was a good one." He said he was seriously concerned at the *increasing number of vessels lost at night*. It appeared the enemy was assisted in this matter by *negligence on the part of shipmasters*, who displayed lights instead of darkening their vessels.—*Shipping*, 9/3.

GERMANY USING U-BOATS TO PREVENT AMERICA FROM FEEDING THE NEUTRALS OF EUROPE, ASSERTS WAR TRADE BOARD.—The War Trade Board authorizes the following:

Germany's war leaders are using the submarine war weapon to prevent fulfillment of American agreements to feed and relieve European neutrals. A mass of cumulative evidence and indications in the possession of the War Trade Board show that Germany is employing the submarine menace to prevent neighbor neutrals receiving any food or favors at the hands of the United States and its associates in the war and to coerce these neutrals through starvation into political and economic dependence upon Germany quite as much as to strike at the communications of its opponents—Germany's ostensible aim in proclaiming the ruthless submarine campaign.

Wishes to Weaken Postwar Rivalry.—Further indications tend to show that the submarines are being used, along similar dog-in-the-manger lines, to destroy neutral shipping without regard to its employment in order to weaken prospective neutral competitors after the war and to drag down neutral tonnage as far as possible toward a position of equality (or inferiority) with the German mercantile marine, which has lost between 40 and 50 per cent of its ocean tonnage, so that the neutral trader may be equally as badly off as his German rival for tonnage in the after-the-war race for commerce.

No other interpretation can be placed, for example, upon the repeated instances of destruction of neutral Danish ships on voyages between Iceland and the Danish mother country, entirely outside of the war zone, nor upon the multitudinous "mistakes," whereby Dutch and other neutral ships, clinging to the precarious narrow way left open through the prohibited zone are torpedoed outside the zone by U-boat commanders, whose word that the vessels were within the zone is later accepted unquestioned by the German prize courts.

Prominent shipowners in Scandinavian countries have stated their belief that many sinkings were inspired only by the intention to get rid of neutral tonnage so as to increase the relative value of German shipping available at the end of the war. Examinations of the captains of torpedoed ships

before the marine courts in these countries bear out this belief, the testimony repeatedly showing that vessels were attacked far outside the zone.

The intent of the Germans to prevent neutrals receiving food and supplies under relief agreements concluded with the United States is illustrated by the German veto placed upon the temporary *modus vivendi* with Holland, providing for the provisioning of that country. Two food ships loaded with supplies for the Netherlands along with 11 Belgian relief ships have been waiting in American ports for weeks unable to sail because of the refusal of Germany to permit an equivalent amount of tonnage leaving Dutch harbors, the obvious plan of the German authorities being to gather all Dutch ships into home harbors and then prevent any of them sailing by threats to torpedo any vessel leaving Holland waters. To relieve the food situation in Holland the War Trade Board has finally authorized the transshipment of the food in question from the two Dutch steamers to the Holland liner *Nieuw Amsterdam*, which is sailing shortly.

Seek to Frighten Neutrals.—The present campaign of threats and intimidation against the Scandinavian neutrals now carried on in the semiofficial *North German Gazette* and other organs of the German press is obviously intended to frighten the northern neutrals from completing agreements which benefit the neutrals quite as much as the United States and its associates.

Now success of the earnest efforts of the United States Government to rush shipments of bread grain to Switzerland is threatened by the action of German submarines, which, according to now fully confirmed reports from Switzerland, have made a start on a new policy of ruthlessness by sinking the neutral Spanish steamer *Sardinero*, secured with great difficulty to carry food to that country. The torpedoing of the *Sardinero*, carrying nearly 4000 tons of cereals for Switzerland, can by no stretch of the imagination be brought within the scope of Germany's proclaimed submarine policy, since the vessel was engaged not in an enemy but in a supposedly safe trade for a neutral state, was en route to a port to which Germany had explicitly promised to leave open a safe passage and was torpedoed outside the prohibited zone.

U-boat Captain Examined Papers.—To add to the deliberateness of the offence, the *Sardinero* was destroyed after the submarine commander had made a thorough examination of the ship's papers and convinced himself of the nature and destination of the cargo, so that no plea of a "mistake" can be entered by Germany. The evident intent and result of the act was to prevent Switzerland, whose urgent and immediate need of food is well known to Germany, from receiving the American grain; to destroy a Spanish ship for after-the-war trade and to raise by this much the relative value and importance of each German ship afloat at the end of the war.

By the Swiss-American agreement of December 5, the Allies guaranteed to Switzerland for its admittedly urgent needs an eight-months' supply of 240,000 tons of cereals, subject to the assumption that Germany would safeguard the supply ships as specified in its proclamation on ruthless submarining, which provided a safe route to the Mediterranean port of Cette, and promised that submarines would not molest such vessels.

Grain First Allocated to Allies.—To accelerate delivery and provide for immediate necessities before grain from the Argentine, the natural source of supply, could reach Switzerland, the War Trade Board even procured from the scanty supplies in this country 30,000 tons of grain which had been earmarked for the Allies and allocated it to Switzerland, arranging to replace it later by grain from the Argentine, and had further proved its good faith and desire to help out dependent neutrals by successful efforts to secure tonnage to transport the grain. The plans even contemplated bringing the ships back in ballast from Cette to accelerate shipments and remove any pretext for German submarine interference with the ships either going or coming.

It is hoped that Switzerland and other neutrals will contrast the respective attitudes of Germany and the United States toward the problem of feeding the neutrals and will take due notice of this latest attempt of Germany to intimidate neutral shipowners, through ruthless submarining, from carrying food to Switzerland. They will also note the same German spirit toward Holland, which Germany seems determined to prevent receiving food supplies except upon German terms.—*Official Bulletin*, 15/3.

THE UTILITY OF THE MINE IN NAVAL WARFARE has been demonstrated in many ways and at many times, and the improper use made of this machine by Germany will not necessarily remove it from the category of lawful instruments of war. Provided the regulations prescribed by international agreement are observed the mine should continue to play a useful and effective part in any struggle at sea, but its indiscriminate use in the German manner should be forbidden under heavy penalties. Such penalties, it is true, can only in wartime take the shape of reprisals, but it is becoming more and more evident that if this country had taken a stronger line in this direction earlier we should have been saved from much which has made the war as fought by the Germans a disgrace to civilization. The difficulty about the mine is, of course, that it breaks adrift, and as often as not without the mechanism which should make it innocuous having effected its purpose. It has been said that two years after the Russo-Japanese War came to an end ships were sunk by mines which had been laid during its progress. It may be expected that after this war the seas will remain dangerous for even a more lengthy period. While it should be a comparatively easy matter to sweep up the mines which have been laid in known and limited fields, the German submarines have dropped their machines in such a casual manner and without any precautions against their remaining a menace that no one will know where to look for them. The use of the submarine mine-layer has increased immeasurably the peril to come.

Yet, looking at the record of British naval losses in the past year, it is somewhat remarkable to find how small has been the proportion of vessels known to have met their fate by the submarine mine. This is greatly to the credit of the auxiliaries of the navy and their gallant crews engaged in ridding the seas of these dangers. Of the larger ships of the British fleet lost in 1917, the *Cornwallis* was torpedoed in January by a submarine, and the *Vanguard* was destroyed by an internal explosion. The *Drake* and the *Ariadne*, of the larger class of cruisers, were also torpedoed. The fact that while nine battleships were destroyed in 1915, eight in the previous year, and seven during the five months of the war in 1914, as against only four last year, indicates the comparative failure of the attrition tactics of the Germans so far as concerns the principal strength of the British fleet. The losses of the *King Edward VII*, *Russell* and *Hampshire*, all sunk by the agency of mines, were not repeated in 1917.

The lighter units of the navy are peculiarly exposed to the danger of the mine, owing to their being employed continuously in patrol and convoy work. It is not surprising, therefore, that of the casualties in this category of ships a larger proportion must be attributed to this agency. The published list of losses included 22 destroyers, of which about one-half were destroyed by mines. Similarly with the armed merchant cruisers and auxiliary vessels, such as mine-sweepers and guard boats, the proportion accounted for by mines is large. But, taking this into account, the toll of these types of vessels was small relatively to the large number which are at work at all times, either round these shores or in the Mediterranean.—*Army and Navy Gazette*, 2/2.

BARGES TO FOIL U-BOATS.—If actual trials prove the scheme to be practicable, it is understood that in order to check the depredations of the enemy's U-boats, immense oceangoing barges towed by powerfully armed tugs, may be used instead of steamships for transporting freight through

the submarine zones. Long, low-sitting, inclosed craft of steel construction will be tested. Crews being unnecessary, the barges are to be decked a few inches above the water-line so that from a distance they will be practically invisible to a periscope. As is perhaps generally known, a tug, because of its small size and comparatively shallow draft, offers a torpedo a poor target. In a gun duel, should a U-boat risk a fight, the tug would have nearly an even break with the enemy.—*Popular Mechanics Magazine*.

WAR IN THE AIR.—If it will be interesting to see if the Hun airmen who made such determined efforts to bomb London by night will attempt later on to emulate the methods employed by British pilots in their more recent raid on German centers of munition-making and railways. Our airmen descend to quite low altitudes and attack the anti-aircraft batteries in addition to dropping bombs; using their machine-guns freely by day and night against the gunners and the crews of the searchlights at night and firing into munition factories and trains in railway stations. These tactics have been repeated on several occasions, notably on January 21 and 22 in the Dieden-hofen (Thionville) region, where some very heavy bombs were dropped on the steel works and railway sidings. The effect on the men who work the guns and searchlights appears to have been excellent, if one may judge from the comparative immunity enjoyed by our airmen on these occasions, while two tons of bombs were dropped on various objectives.

The use of machine-gun fire at low altitudes against troops on the ground is becoming a more prominent feature of flying tactics with each succeeding month, as one sees in the statements of service for which awards of honors are given. One instance, is that of Second Lieutenant George A. Wells, R. F. C., who was awarded the Military Cross for conspicuous gallantry and devotion to duty in engaging enemy infantry with machine-gun fire from low altitudes and attacking enemy aircraft. On one occasion, while attacking enemy strong points, his machine was so badly shot about that he was forced to return to his aerodrome. He resumed his patrol, however, as soon as he had obtained another machine, and on the following day he attacked a series of strong points with machine-gun fire, flying at a very low altitude for 40 minutes under intense machine-gun fire and field-gun barrage. He was eventually wounded in three places in the arm, but in spite of this returned to his aerodrome and landed his machine safely.

The use of fire by airmen against the enemy infantry in the trenches, as one of the means of co-operation with our own infantry, has become one of the outstanding features of aerial warfare, and is likely to be constantly employed during the present year both by ourselves and the Germans, more especially since so far "the man behind the gun" in the air has distinctly had the advantage over the man on the ground in most of the fighting of this kind which has taken place on the Western front.

Similarly, the attacks on enemy aerodromes and billets by the dropping of bombs, supplemented by fire delivered from low-flying aeroplanes into the hangars, has become more frequent and persistent. The *communiqués* record hundreds of bombs dropped on aerodromes near Courtrai on one night, and twice again at intervals of two and three days the systematic "strafing" by machine-gun fire of the enemy billets about Roulers and so forth, showing a persistent and effective harassment of the enemy which cannot fail to lower the vitality and the *morale* of the troops affected by it.

The enemy, on the other hand, has by no means been idle. He has carried out bombing raids on a large scale over the British line on the Western front. Three-seater aeroplanes have been sent out, a score at the time, by night at half-hour intervals, east of Bapaume, for instance, and every indication points to the probability that they, like ourselves, are rehearsing for more distant raids in the spring and summer both on France and England, and giving practice to the numerous *personnel* whom they have been adding to the strength of their air forces during the present winter.—*Army and Navy Gazette*, 9/2.

PREDICT AMERICAN SUPREMACY IN AIR.—Absolute supremacy in the air will be attained by the Allies within six months with the aid of the United States, according to estimates by War Department officials recently. Of course, they expect the necessary shipping to enable them to get the airplanes to Europe.

Authority has been given to commandeer spruce wherever it may be found in the Northwest, and already the largest sawmill in the world, near Vancouver Barracks, Wash., is working 24 hours a day cutting the finest timber for American airplanes.

One tree recently felled was 260 feet long, 15 feet in diameter, 20 feet from the ground and was 160 feet in length to the first limb. To facilitate hauling it 15 miles to the mill it was split where it lay.

American production of airplanes and engines is being speeded up, shipping is being prepared and the Allies expect to exert themselves to the limit in the next few months to hold their own in the air against the Germans.

The matter of getting the American airplanes to Europe is the crucial element in the aircraft program. No announcement has been made of the method to be used in transportation. Until recently it was understood that it was the intention of the Aircraft Production Board to ship the parts abroad and assemble them there, because of the saving in space on board vessels. It was said recently, however, that the board intended to ship a considerable portion of the airplanes already set up, so they could soon be put into service after arrival.

Pending the arrival of the American airplanes at the front, the United States has made arrangements with the Allies for the use of machines made there, and it is said here that production there is now sufficient to equip the American forces already in the field.—*N. Y. Herald*, 28/2.

A GERMAN OFFENSIVE.—Wherever two or three are gathered together, if other topics fail, a sure source of discussion will be found in the questions. "Will the German fleet come out?" and "How long before the war ends?" Without pretending to the gift of prophecy, it is permissible, perhaps, to suggest that if the first event comes off its date may easily approximate closely to that of the other. A German naval engineer lieutenant who deserted from Kiel in order to obtain a square meal in Holland—for thus he is described—is reported to have stated: "The German fleet is preparing for a general attack on the British grand fleet, but not before the autumn of 1918, when its leaders think they can take the risk." It would be interesting to know how the hungry engineer lieutenant came to know what was in the minds of the leaders of the German high sea fleet. According to many witnesses, the movements of the German naval forces are controlled from the military headquarters, and certainly it is more probable that the orders for the fleet to put to sea, when this is decided upon, will come from Berlin, and merely be repeated by the leaders of the fleet. We are not inclined to put much faith in the assertion of the engineer lieutenant. It was only the other day that Dr. Hertling, the German Chancellor, assured the Reichstag that the high sea fleet acted as a support and reserve to the submarines. It protected their bases and opened the way for them into the oceans to carry on their unrestricted warfare. Since there is no sign at present that the Germans intend to relax their efforts in the underwater blockade, it is only natural to assume that the high sea fleet will be risked in an action at sea. When that time comes it will be because neither the submarines nor the German harbors need the defence of a fleet, and it has become necessary to endeavor to obtain an ultimate decision by a naval battle.—*Army and Navy Gazette*, 2/2.

LESSONS OF THE WAR

EIGHT MONTHS OF U-BOAT WARFARE.—*Evasion Proves Best Defence Against Submarines.*—Aside from the moral question as to the barbarity of submarine attacks as a method of warfare, upon which the civilized world

is unanimous in condemnation, the submarine may be regarded from two points of view: First, as a means of warfare; and, second, as an instrument of warfare. It is particularly with the latter that the present article deals. It may be well, however, first to review the situation from the more general standpoint of the submarine as a means of warfare.

During the period from the week ending April 8 to the week ending December 9, 1917, the number of arrivals and departures of vessels from British ports was 188,012. In that period the number of vessels sunk by submarines was 826, or .44 per cent. In a recent speech, Secretary Daniels asserted that "one thousand ships have been added to allied tonnage since entry of the United States into the war." The question of tonnage is as important as the question of the number of vessels. The incomplete evi-

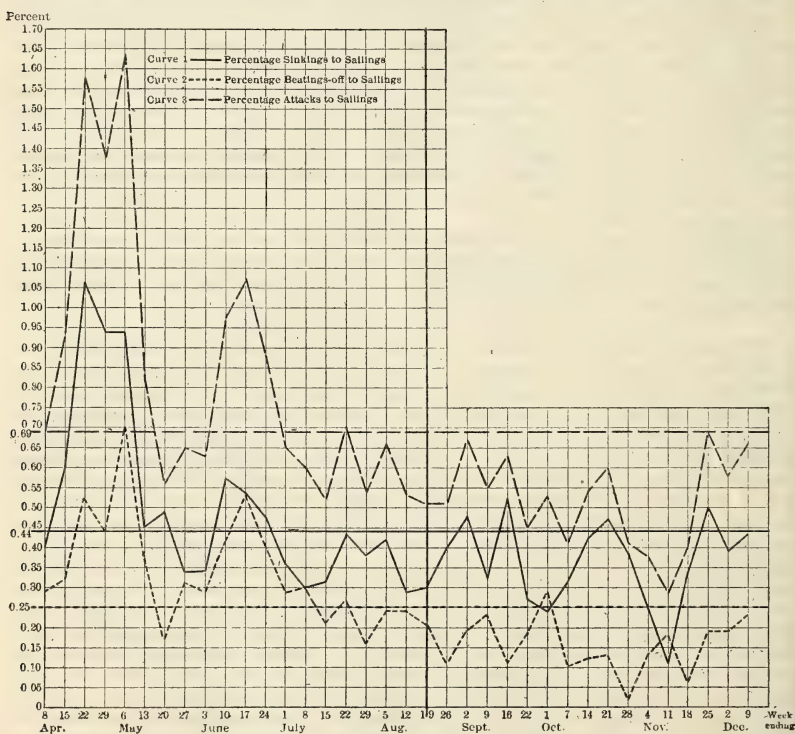


FIG. 1.

dence available indicates that the Allies have maintained the tonnage of their merchant fleets as well as the numbers. Undoubtedly, also, many enemy submarines have been captured or destroyed, so that even if Germany, at best, has been able to maintain the number of her U-boats, she is not accomplishing the destruction of allied shipping. The submarine as a means of warfare must be pronounced a failure, though a danger and a menace.

In considering the submarine as an instrument of warfare three points must be dealt with. First, the ratio of the number of ships attacked to the number of arrivals and departures (sailings) at British ports; second, the ratio of ships sunk to the number of sailings; third, the ratio of the number of ships which beat off attacks to the number of sailings. A fourth point, of perhaps secondary interest, is the ratio of ships sunk, and of ships which beat off attacks, to the number of ships attacked. Fig. 1 deals with the first three

of these questions, Fig. 2 with the fourth. The amount of the tonnage attacked or destroyed is a secondary consideration from this point of view. The effectiveness of the submarine as an instrument is tested even more severely by a small ship than by a large one as far as finding the ship is concerned, and is tested in about the same degree by each in the sinking of the ship.

Discussion of Fig. 1.—1. Curve 1 (full line) shows graphically the percentage of "sinkings" to "sailings" for weekly periods from April 8 to December 9. The straight line 1 (44 per cent) shows the average percentage of sinkings to sailings for the same period. The curve falls decidedly below the average line in passing from left to right. The conclusion may be drawn that the success of the U-boat in destroying (in addition to finding or discovering) ships has decreased.

2. Curve 2 (dotted line) shows graphically the percentage of "beatings-off" to sailings for the same period. Straight line 2 (25 per cent) shows the average percentage of beatings-off to sailings. This curve also falls decidedly below the average line in passing from left to right, showing that

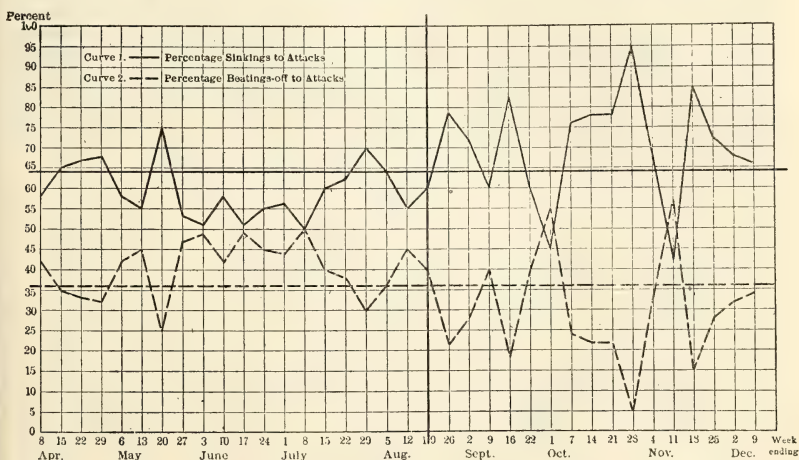


FIG. 2.

the success of ships in escaping from, in addition to evading, the U-boat has decreased.

3. Since both the success of the U-boat in sinking ships and the success of ships in beating off attacks have decreased some common factor must be looked for as the cause. This common factor is probably the unfavorable weather conditions of fall and winter, which make it easier for ships to evade the submarine, but also make it easier for U-boats to do their work and escape when the victim is once discovered. Increased strength of convoys would suggest itself as another factor, since the convoy, by preventing the submarine's attack, would reduce both the percentage of beatings-off and of sinkings. As will be pointed out, however (paragraphs 7 and 8 following), there are reasons to believe that weather conditions are a factor of primary importance.

4. Curves 1 and 2, on being compared, show two markedly distinct periods. In the first period (April 8 to August 19) the curves rise and fall simultaneously, which indicates that good weather conditions (spring and summer) are equally favorable to U-boat and ship. In the second period (August 19 to December 9) the maxima, or highest points, of one curve correspond to the minima of the other. A possible explanation of this fact will be mentioned in paragraph 9 under the discussion of Fig. 2.

5. Curve 3 (dash line) shows graphically the percentage of attacks, successful and unsuccessful, to sailings for the same periods. The heights of curve 3 are, of course, the sum of the heights of curves 1 and 2. Straight line 3 (69 per cent) shows the average percentage of attacks; in other words, the average percentage of discovery of ships. That is, the submarine finds, on the average, 69 out of every 10,000 ships that enter or leave port.¹ Curve 3 falls very decidedly below the average line in passing from left to right, which indicates that the success of the U-boat in attack (*i. e.*, in discovering ships) has decreased.

6. The principal cause of this decrease is, probably unfavorable weather conditions. (See paragraph 8.) On the other hand, the extreme height of curves 1 and 3 in the beginning is probably due to the sudden outburst of U-boat warfare after a long period of preparation. These extreme values make the average value of the percentages high and doubtless explain, in a measure, the failure of the U-boat to "come up to the average." The submarine is probably a more efficient instrument of war than curves 1 and 3 would indicate.

Doubtless, also, the destruction of U-boats faster, perhaps, than they can be built or replaced is another reason for the downward tendency of curves 1 and 3, while another factor of importance is that the number of sailings is less in the fall and winter months—the right-hand half of the graphs. Fewer U-boats, fewer sailings, and bad weather would make the discovery of ships by the submarine more difficult. The following table shows the effect of the calendar on the number of arrivals and departures.

TABLE

April 8 to December 9

Average number of sailings	Greatest number, June 17	Difference	Smallest number, Nov. 25	Difference
5223	5890	+ 667	4180	— 1043

April 8 to August 19

Average number	Greatest number, June 17	Difference	Smallest number, April 15	Difference
5438	5890	+ 452	4710	— 728

August 26 to December 9

Average number	Greatest number, Aug. 26	Difference	Smallest number, Nov. 25	Difference
4953	5709	+ 756	4180	— 773

It must be borne in mind also that another possible factor in the decrease of the percentage of ships discovered and attacked is failure of the U-boat to obtain information as to sailings. Doubtless many sources of secret information have been discovered and suppressed.

Discussion of Fig. 2.—7. Curve 1, Fig. 2 (full line) shows graphically the percentage of sinking to attacks; straight line 1 (64 per cent) the average percentage of sinkings.

Curve 2 (dash line) shows the percentage of beatings-off to attacks; straight line 2 (36 per cent) the average percentage of beatings-off.

These two are, of course, complementary curves, where one rises the other sinks proportionally.

The rise of curve 1 and the fall of curve 2, with reference to the average lines in passage from left to right, show an increase in U-boat success in

¹ For the period April 8 to August 19 the number is 83 in 10,000; for the period August 26 to December 9, 52 in 10,000.

destroying (not in discovering) ships, and a decrease in the success of ships in beating off (not in evading) the U-boat.

8. It can hardly be assumed that the U-boat has become more skillful in attack while the ship has become, relatively, less skillful in defence. Probably the skill of both has increased. On the other hand, there is no reason to believe that more ships are sailing unarmed for defence; and there is reason to believe that more are being convoyed. The conclusion may be drawn, therefore, that bad weather conditions (fall and winter) are favorable to the submarine in sinking, though not in finding ships.

9. The rise of curve 1 would explain also the reversal of maxima and minima in curves 1 and 2 of Fig. 1 for the period August 19 to December 9. Given bad weather conditions, in any week that a U-boat finds ships, it is likely to succeed in sinking a large percentage of them before they can prepare to beat off the attack.

A CYCLE IN NAVAL ARCHITECTURE.¹—With the sanction of the British Admiralty, M. Rousseau, naval critic of the Paris *Temps*, has given the world an account of those new additions to the navy which are popularly known as the "Hush Hush" ships. Their existence has been more or less an open secret for many months, but that fact does not detract from the interest which attaches to the more detailed revelations of M. Rousseau. The new ships are, he says, very long, with immense decks fore and aft. They seemed to lie low in the water, but "perhaps this was an optical effect produced by their length." Amidships there rises a "very squat central castle"—presumably superstructure—flanked by barbettes for "two guns of the biggest caliber." The bows, we learn further, are clipper shaped, this form having "certainly been determined in order to realize very high speed, and, as a matter of fact, these vessels are very swift, much fleetier than the fleetest of pre-war cruisers. These craft—we may call them battle cruisers—are of two types, or, rather, of two dimensions, for their elements of power are, we believe, the same, except as regards protection. As for speed, it is as high on the small as on the big craft, the radius of action having to be the same; and the armament, if it differs in numbers, is the same as regards calibers of the principal and secondary artilleries." These vessels, M. Rousseau continues, have been built since the war, the design having been inspired by the lessons of the war. Laid down in 1915, they have already been 12 months in service, which is justly termed an admirable result of the labor organization in the Royal Dockyards. "Other vessels of the kind are under construction, their dimensions being yet more considerable." The turret is described as containing enormous guns, which fire two rounds per minute, and which, according to the Germans, weigh 96 tons and throw a 1947-pound shell. M. Rousseau goes on to explain that the two vessels he inspected are sisters, designed to work in company, because they have the same fighting power. "They are capable of surprise actions, against which the enemy cannot guard himself, and their speed is a guarantee against the torpedo. None the less they are fitted with devices to neutralize the explosion as far as possible. They are a proof of the confidence of the British Navy in the powerful surface vessel, capable of heavy hitting, the only one which appears able to assure the mastery of the seas. "England," he concludes, "is building many submarines, but the development of this new weapon has not affected the theories which have made the naval power of our Allies, and this is proved by the new building programs, which are the outcome of experience."

There are some people who will probably be surprised to learn that we are still building capital ships, apparently of the largest dimensions, in spite of the submarine, but we ourselves welcome the revelation, and are not in the least astonished at it. In these columns we have consistently upheld the view that "the powerful surface vessel, capable of hard hitting"—in other words, the capital ship—still remains the supreme arbiter of naval warfare,

¹ *The Engineer*.

and that the time is not yet come for the capital ship to yield its place to the submarine. This judgment, we are aware, is in direct conflict with the views of several distinguished authorities, including Admiral Sir Percy Scott, who are inclined to pin their faith to the small and cheap submarine weapon, and have adopted, in a modified form, the well-known tenets of the French "Jeune Ecole." In a recent article we quoted the opinion of the late Admiral Dewey, who declined to concede that submarine development had seriously reduced the value of the heavy fighting ship. He did admit, however, that the menace of underwater attack had become serious enough to justify drastic modifications in the design of surface ships, a point on which there is general agreement. To continue building costly leviathans which, however, great their gun power and armor protection, were liable to be disabled or sunk by a single torpedo, would be manifestly unwise, and we are convinced that this important feature was duly considered when the new ships of which M. Rousseau speaks were in process of design. In fact, he specifically mentions the devices with which they are fitted to minimize the effect of submarine explosion. After a prolonged naval campaign, in which every weapon has been subjected to the final and exhaustive test of action, it follows that many improvements must have suggested themselves. No doubt the capital ship of to-day is designed on principles which differ fundamentally in some respects from pre-war practice. But it is clear from M. Rousseau's remarks that the naval authorities of this country have no intention of abandoning the construction of such ships. In the United States, where the lessons of the war have been most carefully studied, not only are heavy armored ships being built in larger numbers than ever, but the size has grown enormously, and battle-ships of 40,000 tons, and battle cruisers of 34,800 tons, are either building or projected. Nor has Germany lost faith in the powerful surface ship, for it was recently announced that a new battle cruiser, named the *Graf von Spee*, had been launched at Danzig. As long as the three leading naval powers, two of them having had 40 months' war experience, continue to build these vessels, we may take it for granted that the submarine has altogether failed to substantiate its claim to be regarded as the most potent instrument of combat.

Although it is not yet permissible to publish further details of the new British cruisers, M. Rousseau tells us enough to indicate not only the broad features of the design, but also the tactical function the vessels are meant to fulfill. No type of warship has in modern times been the subject of so much controversy as the battle cruiser. When the *Invincibles* were launched in 1907 they were severely criticized by many eminent officers. Far too much, it was urged, had been sacrificed to speed, the tactical value of which had yet to be demonstrated, and when from the comparatively modest figure of 17,250 tons for these ships the displacement rose in the *Lion* class to 26,350 tons, the advocates of moderate displacement were speechless with consternation. The increase in size, great as it was, had become essential in order to realize the ideal at which the Admiralty was aiming, viz., extremely high speed combined with the greatest possible artillery power. In all the battle cruisers designed in this country protection was to some extent sacrificed to obtain these two desiderata. Germany soon adopted the type, but developed it on somewhat different lines. She was content with slightly less speed and a lighter armament, but gave much more attention to armor protection. The war had not been long in progress before the battle cruiser proved its value. The engagement off the Falkland Islands—so far the most decisive action of the war—was rightly hailed as a triumph for the battle cruiser, though its success on that occasion was more strategical than tactical, for it was only by virtue of their high mobility that the *Invincible* and *Inflexible* were able to cross the ocean at the sustained sea speed of liners, and arrive at Port Stanley in the very nick of time. In the later action of the Dogger Bank, and also at Jutland, the battle cruiser was found to be more vulnerable than had been suspected, but the fact that

it risks disablement or destruction by engaging battleships for any length of time does not discredit the tactical theory which evolved this type. The new British cruisers of which M. Rousseau writes would appear to be the logical development of the *Invincible* archetype. They are, as he says, extremely fast, and their armament comprises a very limited number of exceptionally heavy guns. To find the true origin of the battle cruiser we must go back 45 years, and seek it not in England but in Italy. It was in 1872 that the keel of the *Duilio* was laid at Castellamare, a ship that represented precisely the same tactical idea that resulted in the *Invincible* of 1907, and the new cruisers now with the grand fleet. As originally planned the *Duilio* and her sister *Dandolo* were to have displaced 10,401 tons, but actually they were nearer 12,000 tons. They were 341 feet long between perpendiculars, 64¾ feet in beam, and had engines of 7700-7900 indicated horsepower for a speed of 15 knots. The hull was protected by a belt of 21-inch armor, which, however, was only 107 feet in length, thus leaving more than two-thirds of the side bare of vertical armor, but a flat deck composed of iron and steel plates ran from end to end of the ship at some distance below the water-line. The side above the main belt had 17¾-inch armor and formed a central citadel, surmounted by two turrets protected by 17¾-inch armor, and each containing a pair of 100-ton guns. These turrets were placed *en échelon*, with the centers at a distance of 7 feet 8 inches from the center line of the vessel, an arrangement that rendered it possible to train three guns parallel with the keel, while all four covered a limited arc on either beam. These were the salient characteristics of a design which attracted great interest in naval circles everywhere by reason of its novelty, and combined in a single ship immense gun power and high speed. The famous *Inflexible*, laid down in England two years later, was admittedly a modified copy of the *Duilio*, though in her case great speed was not a conspicuous feature. In Italy the integral idea was further developed in the *Italia*, an amazing specimen of naval architecture for those days. This vessel displaced over 15,500 tons—several thousand tons more than the largest warship then afloat—was 400 feet long, and was intended to steam at 18 knots, whereas scarcely any of the existing armored vessels were good for more than 14 knots. Like the *Duilio*, she carried four 100-ton guns in écheloned turrets, but she differed in having no vertical armor at all. The vitals were protected by a 3-inch steel deck, and amidships rose a redoubt of 19-inch steel, to defend the gun positions. In speed the *Italia* was quite unique among her contemporaries, and this fact, coupled with her ponderous battery, made her, in the opinion of many, by far the most formidable warship in the world. A sister ship, the *Lepanto*, launched in 1883, was followed in 1887 by the *Re Umberto*, another vessel of the same generic type, but with the displacement reduced to 13,250 tons, and the armament to four 13.5-inch breech-loaders. On the other hand, the speed was increased to 20 knots, and in place of the central redoubt a thin belt of armor was fitted. Moreover, the échelon system was discarded, and the turrets were placed on the center line, for at that date broadside fire was already recognized as of more importance than end-on fire, which alone had warranted the tactically vicious échelon arrangement.

For many years Italy alone continued to build vessels of the general type described above, for at that time other countries were absorbed in problems of armor, and apparently regarded speed, and even gun power, as secondary considerations; but it must always be placed to the credit of the Italian constructors that they were a generation in advance with their tactical theories. Between the latest British battle cruisers, as described by M. Rousseau, and the *Italia* there are no fundamental points of difference, though they are separated by nearly 40 years, and a most interesting cycle in naval design is thus completed.—*Scientific American*, 5/1.

VALUE OF MONITORS.—What would, however, be of great interest would be some definite information as to what this episode teaches us of the fighting value of monitors of the *Raglan* class. Of the value of the American 14-inch rifle there is, of course, no doubt at all, if we assume it to be rightly aimed and controlled. But the control of guns in a small monitor, which is not particularly seaworthy and which in many conditions of wind and weather cannot keep a course for more than a minute or two at a time, presents difficulties much greater than the same problem in battleships. With everything in the monitor's favor then, she would not be likely to make so many hits per gun per minute as a battleship would make with equal artillery in similar conditions. A broadside of 10 guns in a seagoing ship would be expected therefore to make more than five times as many hits in any given time as the guns in a monitor. If, as I have suggested, *Raglan* was unable to open fire at all, the events of January 20 would necessarily throw no light on her fighting capacity whatever. But it should throw some light on her capacity to stand punishment, and if these monitors were built to engage either battleships or seacoast forts, it is to be presumed that a certain capacity to stand punishment must have been contemplated. For in either event her opponent must have been expected to command the higher probability of more rapid hitting, so that unless the monitor could put up with a good many hits before being out of action, the chance of her damaging her enemy and hence being of any fighting value, must be slender indeed. All we are told is, that *Raglan* was "heavily" hit. That might mean half a broadside—or five broadsides. If one 11-inch shell sufficed to knock her out, then five would be very "heavy" hitting.

The question is interesting because, while we have often heard of monitors being employed against Zeebrugge and other positions on the Belgian coast, the sinking of no one of them has yet been reported, nor with the exception of a small monitor sunk by enemy submarine whilst co-operating with the army in Palestine have we ever learned of any one of the ships of this class even receiving a casualty in action. Have none ever been so exposed that they could be hit? Or being hit, have they received the blows of the enemy without damage to themselves? What was the difference between the conditions in which they had previously figured and those which were so disastrous for them? It is obvious that an examination of the data of the fight at Ibros should throw a very valuable light on the wisdom of the policy that gave these novel—but untried—craft to the British Navy, at a time when the dangers of the submarine campaign seemed to call for nothing but concentration upon the production of destroyers.—*Land and Water*, 31/1.

LORD JELlicoe's SPEECH.—Lord Jellicoe made a speech of great importance at Hull recently when he gave his audience for the first time in the course of this war an estimate of at least one future date, to wit, the date when the rate of building, etc., should have mastered the submarine peril. He did not give the date as a definite one, still less of one of minimum time; he gave it as a maximum limit and fixed it for next August—roughly six months from the present date.

There is no one else who can speak with anything like the authority of Lord Jellicoe in the matter, and his judgment will be received everywhere with a respect that certainly does not attach to the wild speeches of politicians. Apropos of those speeches, Lord Jellicoe very wisely reminded his audience that almost every irresponsible piece of boasting was followed by a disaster and that this was particularly the case with the extraordinary belittling of the submarine peril in the recent past by the Prime Minister. All that, however, is of no practical importance. The important thing is that the man who can tell us most about it has warned us that there will be a continuation of the present strain for at least six months.

The nation can stand the strain if it is properly informed, in the old sense of the word "informed," that is, not fed with sensational tid-bits of news,

but educated in a right judgment of the situation. Of course, decisive events on the continent, whether within the enemy's territory or against his armies, would change the whole problem, but as things are we must bear in mind that term, next August, and not shrink from the length of the ordeal before us.—*Land and Water*, 14/1.

SHIP CAMOUFLAGE.—Many ship owners are slow to grasp the importance of camouflage on their ships leaving Atlantic ports bound for the war-zone. To show that the government appreciates its value, it has, through the Federal War-Risk Bureau, granted a reduction of one-half of 1 per cent in the rate on vessels using one of these approved systems, and also provided with smoke-boxes and sufficient anthracite coal for two days' steaming in the zone.

A trip around any one of the several large harbors along the coast will give ample opportunity to see the different types of camouflage. There are two types, two distinctive types—the low visibility and the dazzle system. The low visibility type aims to present the minimum of visibility of a vessel. The dazzle system of painting a ship is designed to make a vessel appear more conspicuous at short ranges in order that a false impression may be given of her true form and her exact dimensions. There is no attempt at the imitation of either the sea or the sky. In a sentence, the dazzle system is aimed to fool the U-boat commander on her perspective.

There have been scores of marine camouflage patterns submitted to the Shipping Board for consideration. Some are good and possess considerable merit; others are faulty and utterly impracticable. Three factors enter into a suitable camouflage design for a ship: First, the power of the design to present low visibility or dazzle effects. Second, the cost to put the design upon the vessel; paint is costly and \$1000 should not be wasted. Third, the design submitted must, if proved practicable, present the minimum of difficulty in painting on the vessel. In other words, if the design is of the dazzle type it must aim to present the maximum of illusion with the minimum of difficulty in painting. The stern of the average vessel is a hard proposition when it comes to placing a camouflage pattern upon it.

There are, however, four men who have contributed excellent camouflage systems. They are not mere theories. Their patterns can be seen on vessels entering "an Atlantic port." These men are Messrs. Herzog, Mackay, Brush, and Toch.

The first two men aim at reducing low visibility. Messrs. Brush and Toch both say their systems baffle the range-finder while not reducing visibility too much. In brief, the Herzog system is painted on a vessel in diamond designs; the Mackay is composed of oblong dots, the Brush system is in black and white, while the Toch idea is embodied in S-shaped waves of four vibratory colors.

One example of camouflage proved clever enough to fool an expert at the art as well as a naval officer. The former was first to discover the deception. Says *The Commercial Appeal*:

Recently a United States naval officer and a camoufleur of repute were gazing absently from the top floor of a New York sky-scraper. Suddenly the officer called attention to an object moving slowly down the river. As their eyes became focused they decided it was a United States destroyer conveying a submarine. Then the camoufleur changed his opinion, but the naval officer remained obdurate. The background of the destroyer was the usual battleship gray; the camouflage was painted in jet black and consisted of the design of a full-sized submarine outlined in bold relief. The periscope was painted on the middle stack of the destroyer.

A certain allied cruiser in the Atlantic had adopted a disguise by painting the sides and funnels so as to make it appear as an entirely different craft. The effect aimed at is low visibility. From the bow a curve of gray is painted to a distance of about 25 feet; then the sides of the hull are painted black within 25 feet of the stern, when gray is again used. The

turrets have the gray badly broken by black vertical bands and the funnels are swept by waves of black bands upon the gray surface. The stern presentation is the same as that of the bow—all gray. Running away from another ship the cruiser would appear all gray, but when passing or being passed broadside all the color scheme vanishes, fades away, as it were, so that at night the vision is unable to discern the outlines of the cruiser.

Another method adopted by one of the allied governments for its battle-ships is to paint a heavy line on the bows to present the illusion that the vessel is traveling faster than she really is. This, simple though it appears, is held very highly by camoufleurs, because to register a perfect hit with a torpedo, it is first necessary to estimate exactly the distance, the speed of the vessel to be torpedoed, and the exact direction in which she is traveling.—*Literary Digest*, 16/2.

ATLANTIC

TWO SUBMARINE ENCOUNTERS (DECEMBER 21).—The first one was discovered attacking a sailing vessel and the patrol hurried to the scene of action about 10 miles distant. When they were within 500 yards of the ship the submarine had submerged.

We were soon amid the rushing of the turbulent water that is caused by a huge "sub" directly after submerging. We let go one of our mines from the stern quarter, set to explode at 80 feet.

As these mines are quite powerful, containing a large charge of TNT, we were soon rewarded by seeing the color of the water change in the immediate vicinity of the explosion, and while attending to the picking up of the fishermen it was noted that among the bubbles then appearing on the surface a brownish shine predominated.

Only delaying long enough to make sure that we had finished for "*la Boche*," we picked up the crew without further mishap, the entire incident occupying but 40 minutes from the time of hearing the first report until the consummation of the rescue.

The fates were exceedingly kind to us on this day, for at 11 o'clock that night, while the subject of the recent attack was still under discussion, the lookout on the bridge discovered another monster lying on the surface, for all the world like some huge whale taking the air. This submarine was about 500 yards dead ahead, and while quickly jamming the helm over, the officer of the deck ordered the starboard battery to take a shot. The shot may not have taken effect, as the "sub" was then in the act of submerging, but as we steamed directly over her wake and let go four mines of different sizes in as many seconds we were soon assured that we had done for another.—*Literary Digest*, 16/2.

U. S. NAVAL AIRMAN MISSING; HIS SEAPLANE SHOT DOWN.—A dispatch received by the Navy Department, states that a seaplane operating in European waters in which Ensign Albert Dallan Sturtevant, United States Naval Reserve Force, was on reconnaissance duty was shot down. As the ensign is still missing, it is feared that he was killed.—*Official Bulletin*, 19/2.

LOST U. S. SHIP SAFE.—Safe arrival at a European port of an American-built 110-foot submarine chaser with a French crew aboard, which had not been heard from since January 15, is announced by the Navy Department. The little craft was separated from her escort during a terrific gale while bound for Europe.

No navigating instruments were aboard, but, after being blown far off their course, the Frenchmen estimated their position and headed for port. To their remarkable seamanship is attributed the success of the voyage. With the engines disabled by the storm, the crew rigged up sails from bed coverings and sailed for 39 days.—*Washington Evening Star*, 27/2.

U. S. NAVY TUG "CHEROKEE" SUNK OFF THE ATLANTIC COAST; 10 KNOWN SAVED OF 40 ABOARD; FOUR DEAD PICKED UP BY STEAMERS.—*Survivors are Landed at Philadelphia; Two Men Washed Off of the Second Life Raft Launched.*—The Navy Department is advised that the U. S. S. *Cherokee*, a navy tug, foundered off the Atlantic coast. Of the 40 aboard—five officers and 35 enlisted men—10 had been landed at last accounts, these having been taken to Philadelphia. Four dead were picked up by steamships.

The 10 known survivors got away in the first life raft. Four got away on the second life raft, but two were washed overboard and the other two were dead when picked up by a British steamer.—*Official Bulletin*, 27/2.

NAVY TUG "MARINER" LOST DURING A HEAVY GALE.—The Navy Department is informed that the tug *Mariner* was lost in the heavy gale of February 26. All the officers and crew were rescued and taken to port.

The *Mariner* was a wooden tug, gross tonnage, 220; net, 110; length, 109 feet. She was formerly the *Jack T. Scully*, owned by the Neptune Line, and plied between New York, Boston, and Bangor, Me. She was taken over by the navy in September, 1917, and after repairs costing about \$3000, was commissioned at the New York Navy Yard, December 19, 1917.—*Official Bulletin*, 2/3.

ARMED GUARD COMMENDED FOR ITS CONDUCT IN U-BOAT ATTACK.—Secretary Daniels has commended Thomas J. Beerman, chief gunner's mate, United States Navy, commander of the armed guard on the steamship *Borinquen*, for the discipline maintained and the cool and steady work of the gun crews when that vessel was attacked by a German submarine on the night of October 30, 1917.

In his report to the Navy Department Chief Gunner's Mate Beerman states that he was in his quarters at work on the log when he heard a shout of warning from one of the men at the gun, the commander reaching his station just as the second shot was fired. It was 11.45 p. m. when the forward lookout reported a dark object off the port bow. The weather being misty and foggy, he could not make it out until it was 70 or 80 yards away; then he reported it to be a submarine.

Saw Second Shot Hit.—"The submarine was lying to when first sighted," the commander states. "We think she was receiving news from her headquarters. I did not see the first shots, but the petty officer said the first shot went over the top of the submarine's conning-tower. The second shot I saw hit, exploding and carrying away the conning-tower. She was about three points abaft the port beam. As the captain was putting the ship's stern to the submarine, the third shot was fired. I saw it hit and explode. Before the helmsman could get control of the ship, the submarine lay off the starboard quarter in the trough of the sea.

Went Down in Upright Position.—"After the second shot the submarine seemed to stop and lie in the trough of the sea at the mercy of the gun. The fourth shot fell 10 to 25 yards short. When last seen the submarine was going down on the swell with her bow sticking in the air and stern down. She was going down in an upright position."

The commander of the armed guard praises the captain for the excellent manner in which the ship was handled.—*Official Bulletin*, 18/3.

FOUGHT U-BOAT SIX HOURS.—*Steamer's Gunners Finally Landed a Shell and Foe Submerged.*—An officer of a steamer from an American port gives a stirring account of a 90-mile fight with a U-boat in the Atlantic. It lasted from the firing of a torpedo, which just missed, at 11.45 a. m., until 5.40 p. m. During that time the stokers worked without ceasing to get every ounce of steam out of the boilers. The engineers got her up from a normal 10 or 11 knots to more than 13½.

"The gunners were on duty every second," said the officer. "From the bridge we could see every shot from the submarine. We formed a big, high

target 500 feet long, and the enemy showed only a small dome five miles astern. A couple of hours of ineffective shelling made him a bit venturesome, but our gunners speedily showed him that it was unhealthy to come too close. We had plenty of ammunition, and we used it lavishly. With constant practice, too, our gunners began to get better. Nevertheless, about 3 o'clock the German gunners got out some better shells, and shrapnel began to rain on our decks. The man in the wheelhouse was struck by a splinter. A shot pierced the scupper over the boatswain's room. Another struck us abaft the engine room on the port side.

"For a while the fight was fierce. Then for half an hour no shots were fired, while the submarine maneuvered for position. Our ship was vibrating with the speed. Our captain paced the bridge, keenly observant. When the U-boat finally got the position he wanted and renewed the shell fire, our gun crew decided to let them have it as hot as our gun would stand. After a few minutes we landed a shell squarely on the German's back. It apparently disturbed him a good deal, for he stopped firing at once, then slackened speed, altered course, and submerged."—*N. Y. Times*, 10/3.

AMERICAN SHIP DAMAGED IN FIGHT WITH U-BOAT.—*Arrives at French Port with Bridge Smashed and Shell Hole through Smokestack.*—An American steamship, formerly a German vessel, arrived here with its bridge smashed and a shell hole through a smokestack, as a result of an encounter with a submarine.

The steamship defended itself with its guns on being attacked by the submarine.

A storm was encountered, during which the cargo shifted. The vessel made port with the greatest difficulty.—*Washington Evening Star*, 12/3.

TRANSPORT HAS BRUSH WITH U-BOAT.—The transport, safe at her berth, brings with it a crew, the members of which tell of the "brush" with the undersea vessel and of the courageous conduct under fire of those who manned the American guns, who, fighting against great odds, had won the day. All stand ready to brave the submarines again and the morale of the unit is unimpaired.

The transport made but one trip overseas. After clearing from an Atlantic port she joined her convoy and began the trip across the Atlantic without special incident until she neared the hostile zone. Then things began to happen. First her engine went wrong and she was compelled to drop behind the convoy, believing the trouble could be corrected in a short time. But this was not the case, and when the repairs were made the transport was stranded, but not alone, for, proceeding along her course, the lookout sighted a submarine dead astern, less than a mile away.

Enemy Shows Fight.—The gun crew of the transport was thrown into action and the stern gun was opened up at the enemy craft. At this time the undersea boat showed fight and, remaining on top of the water, began to drop shrapnel shells on the transport.

Closing her shrapnel guns, the submarine crew let loose one of her torpedoes, but the transport maneuvered in time to let it pass startlingly close to her stern. Letting loose again with shrapnel, the German crew worked effectively, several shots finding their mark. The crew of the transport were having trouble with the range. To add to the transport's predicament, the chief gunner had his clothing nearly stripped from his body in a hail of small shell. He was wounded in the leg.

As usual there was an American present who jumped into the breach, took the place of the wounded chief gunner and proved himself equal to the occasion. The volunteer was a 17-year-old youth.

Make Their First Hit.—In the meanwhile the enemy craft had pulled to within 900 yards and sent up the signal: "Surrender, we are overhauling you." The gun crew on the transport answered with their first hit.

Again came the signal: "Surrender, we are overhauling you!" from less than 800 yards, but the transport replied with another hit, and the men swore they would die fighting rather than give a satisfactory answer to Hun challenge.

The shot that closed hostilities was a direct hit, which landed fairly on the periscope deck of the submarine, and with its bursting the undersea craft was seen to dive or sink. The crew, exhausted, but enthusiastic, did not linger to investigate the fate of the enemy ship.—*Evening Star*, 12/3.

AMERICAN CREW PLUNGED INTO ICY SEA TO SAVE NINE.—"Profound appreciation" for the work of the American destroyer *Parker* in rescuing survivors of the British hospital ship *Glenart Castle* was voiced by the British Admiralty's spokesman, Thomas James Macnamara, financial secretary of the Admiralty, in the House of Commons.

Mr. Macnamara made his statement in reply to questions by Sir J. Fortescue Flannery, member for the Maldon division of Essex, who called the attention of the Admiralty to the heroism and seamanship displayed by the crew of the *Parker*.

The Admiralty, said Mr. Macnamara, "profoundly appreciates the seamanship and very great gallantry displayed by the American destroyer *Parker*" in rescuing nine survivors of the *Glenart Castle*, which was sunk in the British Channel late in February. Two of the destroyer's complement deserve the greatest credit, he added, for their action in jumping overboard to effect rescues, in view of the temperature of the water, the choppy sea and the distance of the raft from which the rescues were effected. As to official recognition of these services, he stated, the award was not a matter for the British Government, but for the American authorities.

Lone Man Aboard Raft.—The *Glenart Castle* sank at four o'clock in the morning of February 26. The destroyer, although far distant, picked up a wireless message and hurried to the scene, where she searched the choppy sea for survivors. The first one was sighted at one o'clock in the afternoon—a lone man on board a raft.

In these submarine infested waters it was impossible for the destroyer to halt and launch boats. She threw a line to the survivor, but he was so weak that he became entangled in the line and was carried astern of the destroyer and severely cut by her propellers. He managed, however, to climb back on board the raft.

The destroyer circled the scene and, as it passed the raft again, Quartermaster J. C. Cole jumped overboard, succeeded in swimming to the raft and brought the man back to the destroyer. He was a fireman, Jesse White, of Southampton. He died later on board the destroyer, which continued her search, and in the course of the afternoon sighted three more groups of survivors clinging to rafts and wreckage, all of whom were similarly rescued.

SHELL BURST KILLS THREE OF CREW ABOARD THE "VON STEUBEN."—Three men on board the *Von Steuben*, one of the German vessels taken over by the government, were killed, the Navy Department announced, by a fragment of a shell which exploded while being fired. The extent of the damage is not indicated in the department's statement.

The statement of the Navy Department follows:

"The Navy Department is advised that three men were killed by fragments of a shell which exploded while being fired on the U. S. S. *Von Steuben*."—*N. Y. Herald*, 14/3.

LINER'S GUN CREW FIRED ON CONVOY.—William Lusso, a seaman of an American destroyer in the war zone, was killed and three others of the ship's crew were slightly wounded last January 16, when the armed naval guard on an American liner fired on the convoying destroyer after mistaking her in the darkness for an enemy submarine.

In making this known the Navy Department said Vice Admiral Sims had named a court of inquiry, which was making a thorough investigation. When the liner reached her destination the master gave a complete account of the accident to Admiral Sims, but it has not been made public, nor has there been any announcement as to the extent of the damage to the destroyer.

Admiral Sim's report on the accident was sent to the department by mail, but the name of the seaman was cabled when the destroyer reached port, the dispatch merely saying that he had been killed in an accident, and it was also announced by the department. The seaman's body has been sent to the home of his mother, Mrs. Barbara Lusso, Kansas City, Mo.

In the absence of first-hand details, officials of the Navy Department hesitated to comment on the case. It was suggested, however, that the destroyer might have run out of the place assigned her in the convoy and thus aroused the suspicion of the gun crew. Under certain atmospheric conditions, or at night, one of the new-type destroyers might easily appear to be a large submarine, her masts being about the same height and the deck being almost awash in a choppy sea.

So far as is known, this was the first accident of this kind among American war vessels in the war zone, but some months ago an American warship in the Mediterranean fired on an Italian submarine after it had failed to reveal its nationality when signaled to do so by the American. One man on the submarine was killed and another wounded.

An American naval court of inquiry which investigated the case recommended a reduction of a certain number in the grade of the commanding officer of the American vessel, but asked that clemency be shown because of the zeal and attention to duty shown by the officer. The Italian Government joined in the request, but the court's verdict was allowed to stand.—*N. Y. Times*, 15/3.

U-BOAT DESTROYED BY AMERICAN SHIP.—The American tank steamship *Paulsboro* was the victor on March 1 in a thrilling battle with a giant German submarine, a well-directed shot by the naval gun crew destroying the undersea craft.

Ninety shots were fired by the *Paulsboro* during the fight. She was within range of the guns of the submarine practically all of the time, and her deck soon was littered with fragments of shrapnel. When the steamship arrived recently at an Atlantic port she brought one wounded seaman and numerous scars of battle.

The submarine was sighted late in the afternoon of March 1, appearing at a distance of 8000 yards like a buoy. Within a minute after being sighted the first shot fired by her fell within half a mile of the *Paulsboro*. Gunners on board the American vessel responded immediately, but their first shots fell short of their mark, for the submarine was beyond range.

Americans Joyous in Battle.—Captain Frank W. Chapman, commander of the tank steamship, sounded the alarm and the vessel began to zigzag, going all the while at top speed. The *Paulsboro* is a new vessel of 6945 gross tons, was launched in 1916 and is of good speed. The submarine, however, was a faster craft and it soon was apparent the battle would have to be fought to a finish.

The crew of 37 men on board the *Paulsboro* went to work at their allotted tasks with shouts of glee. The men assigned to pass ammunition sang patriotic songs as they worked. Those below deck were envious of the men on the deck in danger from shrapnel.

The fight lasted more than 45 minutes, the two vessels closing the gap between them by more than 1000 yards. The last 20 shots from the *Paulsboro* fell close to the submarine, which also zigzagged. Then it was noticed that the U-boat had stopped firing, and finally a well-directed hit was seen to land right between her two wireless masts. Down she went, bow first.—*N. Y. Herald*, 18/3.

NORTH SEA AND CHANNEL

THE GERMAN RAID ON THE STRAITS.—A story of the German raid on the Straits of Dover on Friday morning, as related by a young able seaman who took part in it, is as follows:

"This is not the first fight of a similar character in which I have taken part during this war [he said], and yet, thank God, I am unhurt. But it was by far the worst of the four scraps which I have been engaged in. It was a terribly one-sided affair. The only thing I can compare it to is a picture of a man armed, say, with only a revolver or a pop-gun being expected to do battle in a small boat with an armed cruiser. It was a fine starlight night, and was so calm there was not a breath of wind and only a very slight haze. The fleet of drifters to which I was attached was on patrol duty. Shortly after 11 o'clock we received a signal telling us to be on the lookout for submarines. Being then off duty myself, I went down to my bunk, but before turning in I was reading a book. Suddenly, at about one o'clock in the morning, I was startled by heavy and rapid firing, the noise of hurrying footsteps on the deck overhead, and the issuing of rapid orders. My first impression was that we had seen, and were firing at, a submarine. Picking up my life-belt I hurried on deck.

"The noise of the cannonade at this time was almost deafening. The first thing I saw on reaching the deck was the blowing up of one of our drifters, which was not far away on our port quarter. She went up in the air enveloped in a great sheet of flame, in the midst of which I distinctly saw her two masts and her funnel fall with a splash into the water, sending up spray in all directions. For a moment I stood watching the awful sight, and then the thunder of additional guns coming rapidly from various directions at once indicated to me that we were up against something more than a submarine fight. I ran along deck aft as my mate shouted, 'There goes another one,' and he had scarcely made the remark before a third boat was blown up. Following the direction indicated, we saw that they were both enveloped in flames, but they were too far off for us to render them any assistance. Moreover, it was a case of having to look out for oneself, for just at this moment our own vessel had a marvellous escape.

"Suddenly, immediately astern of us, a searchlight shot out, sweeping the sea for some distance around, and by its light we were surprised to see the big dark hull of a German destroyer. She was bearing down on us at full speed, and had she continued on her course she would have cut us and sunk us easily. She was not more than 200 yards away from us. It is our belief that we owe our escape to being too close to be hit. We were sailing away from the destroyer, dodging all the time, and, fortunately for us, she missed us as she steamed northwards.

"The noise of the fight was terrible. Shells were falling in all directions. There must have been five or six German destroyers engaged in the raid, and they kept steaming in and out among our fleet of drifters, blowing us up like shuttle-cocks. We hadn't a ghost of a chance. The fight lasted for more than half an hour. Our boat was not touched, and fortunately not a single member of our crew received any injury. We got into harbor all right."

An official telegram from Berlin on February 15, says:

"On the night of February 14 our torpedo-boats, under the command of Captain Heinecke, made a surprise attack on the strong forces guarding the English Channel between Calais and Dover and Cape Grisnez and Folkestone. A large guardship, numerous armed fishing steamers, and several motor-boats were forced to give battle, and the major part of these was destroyed. Our torpedo-boats suffered no losses or damage, and have all since safely returned."—*Reuter*.

The Admiralty report stated that enemy destroyers made a swift raid on our patrols, of which one trawler and seven drifters were sunk, and retired rapidly before any of our forces could engage them.—*London Times*, 22/2.

The Admiralty statement regarding a raid reads:

"A swift raid was made by a flotilla of large enemy torpedo-boat destroyers at 1 a. m. to-day on our patrol forces in Dover Straits.

"The following craft, which were occupied in hunting a submarine which had been sighted by the patrol, were sunk:

"Trawler *James Pond*, drifters *Jamie Murray*, *Clover Bank*, *W. Elliott*, *Cosmos*, *Silver Queen*, *Veracity* and *Christina Craig*.

"After having sunk these vessels the enemy destroyers returned rapidly to the north before any of our forces could engage them."—*Washington Evening Star*, 10/3.

THE WAR AT SEA.—(By a Naval Officer.)—The resumption of raiding by the enemy destroyers from the Belgian ports, after a lapse of something like 10 months, must be regarded as significant of a development in plan rather than a change in policy. The German sallying tactics, which have been a feature each year of the war at sea, were foreshadowed by their technical writers long ago as necessary in view of our naval superiority. The purpose of the sallying tactics, which was to overpower by superior force or stratagem detached portions of the hostile fleet with a view to the reduction of that superiority, was also clearly explained. The manifestation of these tactics, their realization in action, is what is called the war of erosion or attrition. The submarine campaign is one form of the war of attrition, and in a certain sense it may be described as falling within that part in which the aim is to lessen the hostile force by stratagem. The submarine, as a rule, works alone with secrecy, silence and stealth.

But when the war began the idea of using the submarine in the way in which it has been used was as uncommon among the Germans as it was among ourselves. Had it been otherwise, von Tirpitz would have built a good many more underwater craft than he did, and Weddigen would not have been so surprised by his own successes. The original methods by which the war of attrition was to be carried out were mining operations and oversea raids. The former is still employed, and has been largely developed by means of the submarine minelayer, but the latter, although it has had some success, has been on the whole a failure, and when it is now attempted it is always worth while to look for another motive than that which is ostensible and on the surface. What, then, may be the significance of the resumed raiding in the Narrows?

The immediate object of the destroyer raid soon after midnight on Friday last was the destruction of the drifters, the outposts of the Dover patrol. These vessels may have formed a tempting target, for without escort they were bound to incur the serious danger of being overpowered by a much superior force. But unless the Germans were extremely well advised of the disposition of the British patrol their destroyers were also running risks, which, as experience has shown, might be ill-recompensed by the sinking of a few armed fishing craft. Raids of the nature of that of Friday night are extremely difficult to meet. It is of their essence that those who make them can select their own time for delivering the stroke, can choose the route by which to travel, and can determine exactly how far to go and when their own security demands return. They will make sure that the weather, the tide and the conditions of the night are all in their favor.

Two things may mar their plans. They may blunder in the dark into a bunch of British destroyers and get the worst of it, as they did in the encounter with the *Swift* and *Broke*, or they may find that they are cut off from home by a superior force, as nearly happened, apparently, when the Harwich Flotilla engaged and chased 11 German destroyers to within range of the guns of the batteries of Zeebrugge on May 11 last year. Then they only escaped by the skin of their teeth. Neither of these things happened on Friday night, and the raiders got back to their port without a fight, a stroke of ill-fortune for the British seamen, which demands sympathy and not censure. It would have been a source of much gratifica-

tion to them had they been given the opportunity for a display of those qualities they have so often shown during the war.

In the official *communiqué* it is stated that the vessels which were sunk by the enemy were occupied in hunting a submarine, when they were overwhelmed by the gun-fire of the enemy destroyers. A seaman also, who has been permitted to tell his share of the fight, says, "it was a fine starlight night, and was so calm there was not a breath of wind and only a very slight haze. The fleet of drifters to which I was attached was on patrol duty. Shortly after 11 o'clock we received a signal telling us to be on the lookout for submarines." And when he was startled in his bunk by the noise of firing, his first impression was that his ship was attacking a U-boat. These statements make clear the business of the drifters, and unless rumor is ill-founded, they had not been without success quite recently. Indeed, the *Daily Mail* states, with an appearance of authority, that four submarines had been destroyed in these waters during the past three weeks. If this was the case, there is here an indication of the secondary, but perhaps more important, motive for the raid. It may be regarded as certain that the destroyers never intended to come further than they did. It was their work to get rid of the drifters, and then to get back without damage or loss. But it seems more than probable that they convoyed a flotilla of submarines, or submarine minelayers, or both, which on the removal of the patrol was able to pass through the Straits and may presently be heard of again. The fact that a submarine bombarded Dover on the following night is in a measure evidence that something of the kind happened. Manifestly, the prevention of a raid in which the enemy had the advantage of being able to fire at every craft which comes within sight the moment it is sighted, while our officers have to discriminate between friend and foe before they fire, is one operation and the closing of the Straits to submarines is quite a different job. There is another reason why this raid may be regarded as a part of the submarine campaign. It bears in several respects a resemblance to that which took place on October 26, 1916, when it was admitted in Parliament that a number of our drifters on patrol duty in the Straits were sunk. That raid was followed by a recrudescence of submarine warfare, for returns prepared by the Liverpool Underwriters' Association showed that during October of that year 113 vessels, aggregating nearly 270,000 tons, were posted in the loss book. And in November the U-boat war on commerce was rampant in many localities. The submarines that committed those depredations may have got through the Straits or may have had to go round by the much longer route, but obviously there is every reason for closing the former passage by every possible means. For this purpose a vigorous offensive policy is clearly indicated and, after the recent changes at the Admiralty and elsewhere, is confidently expected by the nation.—*Army and Navy Gazette*, 27/2.

TWO HYDROAIRPLANES SINK U-BOAT IN ENGLISH CHANNEL.—An encounter between two French hydroairplanes and a German submarine in the English Channel recently probably resulted in the sinking of the U-boat after it had been bombed by the airplanes, according to an official announcement by the French Admiralty.

The airplanes were on patrol duty over the Channel when they discovered the submarine on the surface. They attacked it, after maneuvering so that the sun was at their backs, and the submarine plunged, but it did not disappear before the aviators had succeeded in dropping several bombs on or over the periscope.

While one airplane returned to the base for more bombs the other kept watch and saw the submarine emerge after a few seconds with a list to port of 45 degrees. After attempting to right her the submarine again disappeared, only to reappear a third time. Her instability increased, and suddenly the observer saw the submarine list still further and sink, so that even the periscope could not be seen.—*N. Y. Herald*, 16/2.

BRITISH HOSPITAL SHIP SUNK; ALL ARE SAVED.—The British hospital ship *Glenart Castle* was sunk at 4 a. m., February 26, in the Bristol channel, it is announced officially. There were no patients on board. Survivors were landed by an American torpedo-boat. Eight boats are still adrift. She was outward bound and had all her lights burning.—*Washington Evening Star*, 27/2.

FORTY-EIGHT LOST, 500 SAFE AS FOUR TORPEDOES SINK THE "CALGARIAN."
—Official announcement was made by the Admiralty that the British armed mercantile cruiser *Calgarian* was torpedoed and sunk on March 1. Two officers and 46 men were lost.

There were 610 persons on board, nearly 500 of whom have been landed at an Irish port. The *Calgarian* was struck by four torpedoes.

The Allan line steamship *Calgarian* was a vessel of 17,515 tons gross, 568 feet long and 70 feet of beam. She was built in Glasgow in 1914. There are no published records of the recent movements of the *Calgarian*, which for some time has been in the service of the British Government. The last report given out concerning the liner was in April of 1916, when she sailed from Halifax for England with Canadian troops. A most unusual circumstance in connection with the sinking of the *Calgarian* is the fact that she was struck by four torpedoes. So far as published reports have shown in no previous case has a merchantman been subjected to such a heavy attack by submarines. Evidently the Germans concentrated U-boats to ensure the sinking of the vessel.

The people of this town (an Irish port), who a few days ago won the gratitude of the American people by their kindness to the survivors from the *Tuscania*, have extended their hospitality in the last few days to nearly 500 men from the *Calgarian*, one of the finest auxiliary cruisers in the Atlantic service. The *Calgarian* was torpedoed in the late afternoon not far from the place where the *Tuscania* met her doom.

The ship's bell had just sounded 4 o'clock when a torpedo struck. The shock was so slight that it was thought the vessel had merely touched a mine astern. It was hoped to get her safely to port.

A considerable time later a second torpedo struck her, followed quickly by two more. By this time there were several trawlers and patrol vessels in the vicinity, and the work of disembarking the crew was hastened. By good fortune the *Calgarian* remained afloat on an even keel for some time, notwithstanding the four torpedoes.

It was possible to take off nearly all the crew except the men in the stokeholds and others who had been injured by the explosions.

Most of the rescued men were brought here. Hot meals and dry clothes were provided, and there were turned over to them the same beds which the *Tuscania* survivors had occupied a few days before.—*N. Y. Herald*, 7/3.

U-BOAT ENCOUNTER.—*Trawler's Captain Tried to Ram Her, Then Knocked Off the Periscope*.—When a vessel is in danger of submarines anything will do as a weapon of defence, as is shown by the story of a captain of a British trawler who used a coal shovel with good effect against a German U-boat. The trawler, according to the story told by one of the crew, was in the North Sea in a stiff breeze when the skipper saw a periscope crawl through the breaking surface of the sea about 100 yards off. There was no gun aboard, and the trawler's best speed was less than 8 knots.

"It was a situation to dismay most men," said the sailor. "Our skipper, however, has a fighting spirit. A touch of the wheel sent the trawler's blunt bows pointing at the submarine's whaleback, and we wallowed menacingly toward the pirate. The U-boat swung round to avoid the impact and the sides of the trawler scraped along the sides of the submarine. The periscope was still well out of the water, but was beginning to slip down as the submarine dived.

"The skipper bawled for a hammer, a crowbar, anything that would hurt. One of the crew thrust a coal shovel into his hand and he scrambled on the bulwarks and leaned over, two of the crew hanging to his coat so that he wouldn't fall overboard. Backward and forward he swung the heavy scoop at the fragile periscope, and the third blow reduced it to fragments.

"The submarine commander, hearing the noise and wondering what new and horrible device the enemy had invented, crept to his periscope to have a look, but all was black. He was blind, and the trawler got away safely."—*N. Y. Times*, 10/2.

SHIP HALTED BY ZEPPELIN.—How his vessel was halted by a Zeppelin and a German submarine, all in the space of an hour, is the story being told by the master of a Swedish steamer now in port.

"The master said that in the same ship he has now in port he was bound from Gothenburg for England. In the North Sea a Zeppelin hovered over his ship and ordered him to stop. He at once complied with the voice from the air.

"The the Zeppelin maneuvered until it was about 300 feet above the steamer, when the commander of the huge dirigible ordered, through a megaphone, the captain of the steamer to open his papers and spread them on the deck.

"This was done. The master of the Zeppelin placed a glass to his eyes, and, reading that the German consul at Gothenburg had given the ship a clearance through the war zone, declared all was correct and told the master to continue.

"This was not done, however, until a U-boat swashed out of the sea, shook all the water off her deck and ran alongside the Swedish ship."—*Evening Star*, 24/1.

BALTIC AND SKAGERRACK

NAVAL POWER IN THE BALTIC.—*Swedish Concern about the Aaland Islands*.—In conversation with the Petrograd correspondent of the Swedish Socialist newspaper *Politiken*, the Russian Commissioner for Foreign Affairs, M. Trotsky, stated that among the documents found at the Foreign Office was a secret treaty between Germany and Russia, signed in 1907, by which the German Government formally consented to Russia's fortifying the Aaland Islands, declaring that it would not consider such an act as constituting an infringement of the Treaty of Paris. M. Trotsky added:

"I do not consider that this justifies Russia in fortifying the islands, but it proves that in so doing she had the consent of Germany. The whole situation in the Baltic is now altered by the German possession of Moon and Dago islands, which she will fortify, creating a Baltic Gibraltar commanding the whole sea. The interest of Russia, Finland, Sweden, and Denmark is one in this matter. It is only at the general peace negotiations that a final settlement can be attained. We are, therefore, of opinion that Sweden will have to be represented."

When this statement, telegraphed from Petrograd, appeared in *Politiken*, the German minister here lost no time in sending a communication to the Swedish press, pointing out that the secret treaty therein mentioned only concerned *une abrogation éventuelle* of the servitude imposed on Russia by the Paris Treaty of March 30, 1856.

Baron von Lucius added that Germany's declaration regarding this abrogation naturally implied that Russia should have previously obtained Sweden's consent to it.

These statements are creating considerable sensation. The press, in discussing them in connection with recent phases of the Aalands question, remarks that, while they establish that Germany already in 1907 had virtually signed away the treaty guarantee given to Sweden in a matter of vital importance to her, it was equally known by another of M. Trotsky's

revelations of diplomatic documents that representations to the same effect had been made at the time to France and England. What reception these had met with was unknown, but there was nothing to prove that their request had not been more or less tacitly conceded.

The British Attitude.—In view of the feeling that this controversy is creating, I determined to ask the British Legation for some authoritative statement showing what the attitude of the British Government had been on that occasion. I have been authorized to state that in June, 1907, the Russian Government approached the British Government regarding the abrogation of the Convention of 1856 respecting the Aaland Islands. Sir Edward Grey, in reply, pointed out to the Russian Ambassador that if the Aaland Islands were fortified Sweden would feel herself in a very disadvantageous position, and suggested that a conference of the four powers, Great Britain, France, Russia, and Germany, should be held to consider the question in connection with the treaties of 1855 and 1856. No further discussions on the subject took place between the two governments until December, 1907, when M. Isvolsky spoke about the Aaland Islands to Sir Arthur Nicolson, British Ambassador in Petrograd. Sir Arthur Nicolson reported M. Isvolsky as saying that he understood that his Majesty's Government's chief objection to the abrogation of the Treaty of 1856 being discussed in the summer was that at that moment it would have been painful to Sweden, that his Majesty's Government were desirous, if the Aaland Islands question was brought into discussion, that this should be done in connection with the whole Baltic question at a conference of the interested powers, Germany included. In a later dispatch, dated the same month, on the same subject, Sir Arthur Nicolson reported that he spoke to M. Isvolsky as follows:

"I observed that I understood my government reserved their action as to the Aaland Islands until they were in possession of the text of any arrangement concerning the Baltic. I presumed that when M. Isvolsky had settled matters with Sweden he would address himself to London and Paris, and the Cabinets would decide in what light they would regard the arrangements that might be concluded."

Further, at the beginning of January, 1908, Sir Edward Grey informed Count Wrangel, Swedish Minister in London, that the British Government had not resumed the discussion with the Russian Government about the abrogation of the Aaland Islands treaty, and that, before proceeding with any discussion of this abrogation of the treaty, he would like to see the draft of whatever was proposed. Regarding the matter in the light of these facts, it is clear that the British Government had no intention of acting in the matter until Sweden had been duly consulted.—*London Times*, 22/2.

RUSSIAN TRANSPORTS SUNK BY GERMANS.—Two Russian transports were attacked and sunk by German destroyers after a fight south of the Aaland Islands, according to a Copenhagen dispatch to the Exchange Telegraph Company. Having taken possession of the Aaland Islands under the terms of the recent treaty signed with the Bolshevist Government, the Germans may have assumed that the Russian transports had no business in the waters to the southward of the islands.—*N. Y. Times*, 10/3.

TWO AMERICANS SHIPWRECKED ABOARD RAIDER'S PRIZE VESSEL.—The Spanish steamship *Igotz-Mendi*, with a German prize crew from the Pacific Ocean on board, is ashore near the Skaw lighthouse. Two of the prisoners aboard are Americans.

The prisoners on board the *Igotz-Mendi* were taken from six ships which had been sunk. Several of the prisoners had been aboard the vessel for eight months while she cruised in the Pacific Ocean.

Twenty-two persons, including nine women, two children and two Americans, have been landed by a life-boat from the Skaw.

The Danish authorities have interned the German commander of the *Igotz-Mendi*. The German prize crew refused to leave the ship.

There had been an epidemic of beri-beri and scurvy on board the vessel.

Nine women and two children were among the rescued passengers, who included one Dane, one Swede, one Norwegian, two Finns, two Hindus, one Chinese, one Turk, one Greek, one Chilian and two Americans. The remainder of the prisoners were British. Many of them suffered from inadequate nourishment in the last five weeks.

[The German auxiliary, the *Wolf*, has reached port after a raiding expedition of 15 months in the Atlantic, Pacific and Indian oceans, the German Admiralty announced. A British statement gave the names of 11 ships assumed to have been destroyed by the *Wolf*, one of which was the *Igotz-Mendi*, 4648 tons gross. In addition to this vessel another captured ship, the *Turritella*, was fitted out as a raider, but was quickly sunk. The Skaw, where the *Igotz-Mendi* has grounded, is the northern extremity of Jutland, Denmark.]

The steamship *Igotz-Mendi*, according to a dispatch from Copenhagen to the Exchange Telegraph Company, was captured by the German auxiliary cruiser *Wolf* nine months ago in the Gulf of India. The German navigators who were placed aboard had been following the *Wolf* ever since. All the persons who had been held prisoner on board the vessel, the correspondent adds, have been taken ashore.—*N. Y. Herald*, 27/2.

MEDITERRANEAN

STEAMSHIP REPORTS SINKING OF A SUBMARINE.—An American steamship arriving recently at an Atlantic port reported having sunk a German submarine in the Mediterranean on January 18 last, after a running fight. The steamship was not hit.

On the outward voyage the same craft was attacked in the Mediterranean by two submarines. One was sighted off the bow of the vessel, and when the captain attempted to ram the undersea boat she submerged and made off. At the same time the gun crew fought off another submarine from the stern.

The crew of the vessel reported that British patrol boats captured two submarines off the Canary Islands on January 7.—*N. Y. Herald*, 2/4.

FIFTEEN U-BOATS IN MEDITERRANEAN SUNK IN A MONTH.—Fifteen German submarines operating in the Mediterranean have been sunk in one month by Japanese and American destroyers it was learned yesterday when Captain Sato Yamamoto, Naval Attaché of the Japanese Embassy in Rome, arrived at an Atlantic port. The fighting men from Nippon and Yankeeland worked side by side and in close cooperation with squadrons of war vessels and of seaplanes of the Allies.

Captain Yamamoto said that practically all Austrian submarines have been cleared from the Adriatic and the Mediterranean as the result of excellent work on the part of the Italian Navy. Their places have been taken to a great extent, however, by German U-boats, manned by German crews.

"Airplanes of the Allies have discovered that Trieste is used by the Germans as a base for submarines. The port is an assembling place for the U-boats, which are shipped from Germany in parts. In a few months I predict the world will see a naval attack by the Allies on Trieste. This, I hope, will impair its usefulness to the Germans. In the harbor, it must also be remembered, there are several vessels of the Austrian fleet."—*N. Y. Herald*, 7/3.

A GERMAN RAIDER.—In each of the four winters which have elapsed since the outbreak of the war a German surface raider has succeeded in making depredations on the shipping of the Allies. The first of these commerce destroyers was the *Karlsruhe*. In the two following winter seasons the *Moewe* successfully eluded the British blockading fleet and bagged a number of enemy merchant ships. Word came from Berlin that the auxiliary cruiser *Wolf* had reached a home port safely after an extended cruise in the Atlantic, Indian, and Pacific oceans, in the course of which much damage was inflicted on hostile shipping and many prisoners and much loot secured. Considering how the seas are being policed, it certainly seems extraordinary that a German man-of-war should have been able to remain at sea for 15 months without being caught and without once putting into a friendly port. The return of the *Wolf* clears up certain mysteries, like the fate of the long-overdue steamer *Wairuna*. The presence of this German raider in southern waters may also account for floating mines having been found in the regular steamship lanes near the Australian coast, which neutral vessels in the employ of the enemy have heretofore been supposed to have planted.—*Nautical Gazette*, 9/3.

BRITISH-TURKISH SEA ACTION.—At the time of writing (Jan. 22), the story of the *Goeben* and *Breslau* sortie from the Dardanelles was so incomplete that any discussion of so interesting an adventure would have been premature. The *communiqué* of the 23d, however, gives a far more detailed picture of what happened, and corrects several statements in the previous accounts. But, even now, particulars of many major points are still to seek. Briefly, the story we are told is this:

Lizard, a 750-ton destroyer, armed with two 4-inch and two 12-pounder guns, discovered *Breslau*, with the *Goeben* a mile astern, at 5.30 on the morning of January 24, when she was about two miles from the northeast point of Imbros. The German ships were on a northerly course and steering towards the southeast of Cape Kephalos. *Lizard* at once gave the alarm and engaged the two German ships, at a range of about 11,000 yards, she being under heavy fire the whole time, straddled often, but never hit. She was, naturally enough, not able to turn either ship from her course, and was prevented from closing to torpedo range by the accuracy of *Breslau's* fire as the distance shortened. There was, then, nothing to prevent *Goeben* from getting opposite the mouth of the harbor where the monitors were lying. *Lizard* had kept between *Goeben* and the harbor and, no doubt in response to her original alarm, *Tigress* came out and joined her, when both destroyers did what they could to shield the two monitors by smoke screens. The protection, however, was insufficient and within 40 minutes of the German ships being sighted, first *Raglan* and then *M-28* had been "heavily hit" and sunk. The enemy, having accomplished their mission, turned south, not apparently with the idea of returning up the Dardanelles, but on some other mission. They were followed by *Lizard*, now accompanied by *Tigress*, who, at seven o'clock, saw *Breslau* run into a minefield, in which she seems to have struck, not one but several mines, so that she sank within ten minutes of the first explosion. *Goeben* was apparently leading, for, on seeing *Breslau* sink, she circled round her once and then continued her southerly course. There then came on the scene four Turkish destroyers accompanied by an old cruiser. *Lizard* and *Tigress* engaged the destroyers at once, hit one of them "repeatedly" and drove them pell mell up the Straits. But *Goeben* continued past the Straits, still going in a southerly direction, when an attack by our aircraft "forced" her to turn.

The account does not say whether *Goeben* was hit by this first attack. But the presumption is that the bombs must have fallen close enough to make her realize that the risk of trying to add to her successes by continuing her range further afield was prohibitive. But the decision was taken at an unfortunate moment for, in the actual act of turning, she struck a mine

herself, the injury from which must have been serious, for not only did she settle down aft, but developed a list of from 10 to 15 degrees. Damage of this kind was bound to affect her speed, and it is possible that one of the propeller shafts may have been injured as well. At any rate, her procedure up the Dardanelles was slow. All the four Turkish destroyers that had been driven in by *Lizard* and *Tigress* now turned to escort *Goeben*—from which one concludes that the boat that was hit could not have been very seriously damaged. The Turks also sent out aircraft to put a stop to further attacks from the sky and, in the encounters that ensued, one of our seaplanes seems to have been destroyed. But the others in the meantime continued to attack not only with energy but with effect, for no less than four direct hits were recorded—two before and two after *Goeben* was run ashore, 100 yards from the lighthouse at Nagara Point. *Lizard* and *Tigress* continued to follow up *Goeben*, until the fire from the batteries became prohibitive. The gallant captains of these enterprising craft felt the better justified in desisting when they realized how effective our attack from the air had become. Having left the Dardanelles, they proceeded to the rescue of the *Breslau* survivors, a work, however, in which they were disturbed by an enemy submarine. The story does not tell us how many German lives were lost by this very ill-timed intervention. Later accounts record further direct hits on the *Goeben*, and there is one story to the effect that her decks are now awash. But she has survived so many misfortunes that it needs some hardihood to assert, as so many have done, that she is now finally destroyed.

One can look at this story from two points of view.

What do these events tell us about the art of fighting at sea, viewing them as a naval operation only?

Secondly: What is the political significance, if any, in the sortie? Let us deal with the technical question first.

Imbros lies about 14 or 15 miles from the nearest point of the Gallipoli Peninsula. On a clear day with a good telescope, magnifying, say 45 diameters—not a high power for use in Mediterranean sunlight—objects at Imbros would appear to an observer on any high point like Achi Baba, to be about 600 yards off. But as we know from the despatch describing the first fortnight's work of our submarines in the North Sea, the under-water boat is, in many respects the most efficient scout there is, and all information got by direct telescopic view and by submarine, could easily enough be confirmed and multiplied by aircraft. In deciding to make this raid, therefore, we must realize that the enemy knew exactly what he was doing, exactly what force there was opposed to him; knew, in fact, that he was running no risk of encountering any craft of a fighting power superior to, or even equal to, that of the ex-German battle cruiser. It is important that we should realize this because, when we come to the political considerations lying behind the raid, the degree of risk run by these ships is highly material to their comprehension. Next we must also assume that, at the time when Imbros was made a base for the operations against the Gallipoli Peninsula, it was not thought necessary to protect it by heavy guns. In those days the idea that *Goeben* would come out and either raid the harbor or attack a squadron of our older battleships, would have seemed, as indeed it was, chimerical. *Goeben*, therefore, had nothing to fear from any armament except those of the monitors. The smaller monitor, *M-28*, can be ruled out. She was probably armed only with one 6-inch and one 9.2 guns; there would have been, therefore, no guns to take into consideration except *Raglan's* two American 14-inch rifles. We are not, it will be observed, told anything of *Raglan* engaging *Goeben*. And, if she had engaged her, we surely should have been told. Such an action would have been the first between a monitor and a modern seagoing ship, and very few shells from the monitor might have done decisive damage to the German battle cruiser.

We know that *Raglan* was warned at 5.20 and, though we do not know exactly when the *Goeben* opened fire, yet the interval before she cleared the point that opened up the harbor must have been considerable—for she was soon steaming seven miles out at sea and was still some distance to the south when she was first observed. A very brief interval would have been sufficient for *Raglan* to have got ready for action, if we assume, first, that the only preparations were to man the turret and the fire control station, and that all was well with the ship at the time. We must, then, I think, conclude that *Raglan* was unable to engage, and that the explanation of this is that, not anticipating the possibility of a raid, she was lying with her bows facing inland, and was unable to turn to bring her only guns into action in the interval between receiving *Lizard's* wireless and *Goeben's* opening fire. And it is the more probable that this is the explanation from the fact that *Goeben* took the risk. It is just the kind of detail that might have been ascertained on Saturday evening by aircraft, and may have been the deciding factor in the determination to make the raid.

So far, then, it is quite probable that things went, not only as the enemy hoped, but as he had every right to expect from the information he had been so diligent as to procure. His success indeed had been complete. The intervention of *Lizard* and *Tigress*, though as daring and skilful as it could possibly have been, was nevertheless entirely without results.—*Land and Water*, 31/1.

TURKISH WATERS AND BLACK SEA

BRITISH SUBMARINE SUNK.—The following Turkish official report, concerning operations in the Dardanelles, was issued by the Press Bureau last night (February 4). It was published by the enemy on January 30:

The English submarine *E-14* was sunk off Kum Kale. Seven men were saved. A second English submarine, the *E-82*, had its periscope shot off near Nagara. After further hits a large [? oilspot] was observed, so that this boat may, almost with certainty, be regarded as also having been destroyed.

An English seaplane—Shore type [? Short type] was forced by machine-gun fire to land at Nagara. Its crew were taken prisoners. The machine has been salvaged in undamaged condition.—*Admiralty, per Wireless Press*.

In reference to this Turkish report the Admiralty now makes the following statement:

H. M. submarine *E-14*, Lieutenant Commander Geoffrey S. White, R. N., proceeded to the Dardanelles on the night of January 27 with instructions to complete the destruction of the *Goeben*. Our aircraft, which were also sent to cooperate with *E-14*, reported considerable anti-submarine activity in the Straits.

An official Turkish wireless report has been received stating that *E-14* has been sunk off Kum Kale (the south point of the entrance to the Dardanelles), and that there were seven men saved; no names are given.

The British Commander-in-Chief, Mediterranean, reports that all the other submarines employed in that area have returned to their bases, and that only *E-14* is missing. The latter part of the Turkish statement [that *E-82* might, almost with certainty, be regarded as destroyed] is therefore incorrect.

At noon on January 27, the day on which *E-14* was sent to the Dardanelles, the *Goeben* was still ashore, but a reconnaissance carried out by the British about midnight the same day "established the fact that the *Goeben* was no longer on shore on Nagara Point." It had been beached a week previously after having struck a mine outside the Dardanelles. On that occasion the *Breslau* struck a mine and sank.

The version of the Turkish *communiqué* received through Reuter's Agency says that *E-14* was sunk "by the Dardanelles batteries."—*London Times*, 5/2.

THE "GOEBEN."—The fact as announced by the Admiralty to-day that the *Goeben* has been refloated makes another change in the naval situation in the Sea of Marmora and the Eastern Mediterranean. It seems rather a pity now there should have been so many premature rejoicings over her destruction. The satisfaction that was expressed when the cruiser was supposed to have been put out of action for good was natural in the circumstances. It appeared to make certain, first, that the influence exerted upon the Turks by the presence of this vessel off Constantinople would be removed. That was the political aspect of the affair. From the naval standpoint benefit would be derived from her removal, since it would permit of a rearrangement of forces in the Eastern Mediterranean, and particularly at the Dardanelles. It is beyond a doubt that the accomplishment of floating the ship in spite of all the allied efforts to complete her destruction will have its effect upon the Turkish mind. We may take with many grains of salt the statement from Berlin that the *Goeben* is quite fit for service, but so far as the Turks are concerned her presence once more off the capital—and we may be sure that great efforts will be made to get her there—will restore her prestige whether she is battle-worthy or not. It is quite likely that her return will not be an unmingled source of rejoicing to the Ottoman Government, and still less to the Ottoman peoples. The sight of her will, however, assist to reforge the shackles which bind Turkey to the Central Powers, and thus the political result of what has happened has an important significance. Moreover, however, badly damaged she may be, it is manifest already that this will be minimized, and it may even be claimed that although the *Breslau* was lost, the sinking of the two British monitors constituted a victory for the Turko-German cause, and a triumph to be celebrated by bell-ringing in Berlin.

Regarded from a naval standpoint, the continued existence of the *Goeben* is of no less moment. She has been badly damaged before, and if all accounts are true, both by gun-fire and mine, while it is clear that the resources of Constantinople have proved quite equal to her repair and to fitting her for renewed action. How long it will take, or whether, indeed, it is practicable to make the ship effective again must depend upon the extent of her injuries, but the Germans will certainly attempt the task. In any case, it will be well, in default of further information on the subject, to regard this as a possible event. Obviously, therefore, it will not do to give her the opportunity in a few months time, or perhaps even earlier, to repeat the adventure of ten days ago. It may be unpleasant, or interfere with other plans, but it will hardly be wise to entrust the blockade of the Straits to monitors and mines again unless we are prepared to risk the recurrence of another regrettable incident.—*Army and Navy Gazette*, 2/2.

PACIFIC AND INDIAN OCEANS

BRITISH CAPTURE GERMAN PRIZE CREW.—According to Captain Pearse, a member of the Red Cross, a British gunboat surprised a German prize crew aboard the British vessel *Turritella* while they were laying mines off Perim. The Germans took to the small boats and blew up the *Turritella* while Chinese were in the stoke hole and engine room. The gunboat captured the Germans, who recently were tried at Bombay for murder.—*N. Y. Herald*, 9/3.

[The *Turritella* was captured by the sea raider *Wolf*, it was announced at Berlin on February 26. The British Admiralty later announced that she was an unarmed merchantman.]

Account of the *Wolf*, see p. 927.

Account of the *Igotz Mendi*, see p. 926.

GENERAL NOTES

General Allenby's troops have occupied Jericho and advanced to the Jordan and the Wadi el Auja. Beyond the Jordan, 25 miles to the east, is



THE FALL OF JERICO

the Hedjaz Railway, which carries the Turkish communications to Arabia. The thick black line shows the starting point of the advance on February 19.—*London Times*, 23/2.

GERMAN OFFENSIVE IN WEST NOT EXPECTED TO BE LAUNCHED UNTIL IT IS COMPELLED BY GENERAL STRATEGIC EXIGENCIES.—The War Department authorizes the publication of the following review of the military operations:

The period of inactivity in the west is being prolonged.

Though the raids now taking place would in the past have been considered important engagements, nevertheless, owing to the fact that they are merely of minor tactical value, they cannot be held to be major operations.

While hostile preparations for an offensive in the west are not slackening, it is becoming more evident that the enemy will launch this offensive only if compelled to do so by the exigencies of the general strategic situation.

While fresh German divisions are reported as arriving in the west it is important to note that the density of enemy forces has nearly reached a point beyond which it will be impracticable to go, for should any large

additional body of men be massed, the chances are that the congestion of the lines of communication will become so great as to make it impossible to maintain the flexibility of maneuver, which is so essential.

Our own forces in France have been constantly in action. Our troops are now in the trenches at five different points. We undertook our first assault against German positions, unassisted by any allied contingent.

At dawn on March 11, after a preliminary bombardment lasting three-quarters of an hour, we drove a highly successful raid against a German trench segment.

Our men penetrated the German line to a depth of 300 yards. The enemy was driven off after a hand to hand fight, whereupon our contingent returned to our lines.

At three places in Lorraine American troops, acting in co-operation with small French detachments, raided German trenches. Two of these operations were carried out simultaneously, each on a frontage of some 600 yards.

After a prolonged bombardment the attacking units were able to reach their objectives. Few of the enemy were found in the first line trenches and the attackers swept forward into the German second line. Our men remained for nearly an hour in the German positions and retired after inflicting much damage and capturing a considerable quantity of matériel.

There has been a decided increase in sniping, owing to more favorable weather conditions.

Our artillery was also very active. We kept up a vigorous bombardment on the rear areas opposite our Toul sector. Near the Swiss border where another detachment of our men are in the trenches, hostile bombardments were frequent.

The arrival of our Secretary of War in France is noted.

During the past week the Secretary has had interviews with the leading French authorities and is about to undertake a careful inspection of our schools, training areas, rest camps, as well as those sectors of the front where our forces are in action.

The Western front, from the North Sea to the Aisne, was the scene of much hard fighting. In Flanders, the British were able completely to re-establish themselves in the advance posts near Polderhosk Ridge and Houthulst Wood, which the enemy had captured during the preceding week.

The Germans initiated a number of important raids undertaken on a wide frontage which, had they proved successful, might possibly have developed into engagements of a broader character, as the blows driven in the vicinity of Paaschendaale, Houthulst Wood, and along Menin Road could readily have been linked together into an offensive having a frontage of $8\frac{1}{2}$ miles.

The British successfully raided the German lines from south of St. Quentin to Houthulst Wood.

Along the French front the Germans centered their assaults in Champagne. However, they were unable to make any headway. On the other hand the French retook some trench elements in which the enemy had gained a foothold west of Mont Carnillet.

The Germans carried out a number of air raids against London and Paris. Allied aviators raided German industrial centers of the Rhine region.

In the Italian theatre the arrival of further hostile units and the concentration of material coming from Germany is noted in the area east and west of the Lake of Garda, which would point to hostile operations having Verona and Brescia as their objectives. In the eastern theater the enemy has stopped advancing in the north, while consolidating the territory gained in the south.

The chief operation of the week culminated in the capture of Odessa. An Austrian column bearing down from the north formed a junction with

a German column which had advanced rapidly across Bessarabia. The occupation of Odessa will, no doubt, be of economic importance to the enemy.

In Finland fighting continues. German infantry has landed at Abo and the arrival of important additional German forces on the Aaland Islands is reported.

In Palestine the British continue to advance. They have now pushed their lines 18 miles north to Jerusalem.—*Official Bulletin*, 16/3.

RULES FOR TRANSMISSION OF MAIL TO AND FROM PRISONERS OF WAR
OFFICE OF SECOND ASSISTANT POSTMASTER GENERAL,

February 25, 1918.

All mailable articles (including parcel-post packages not exceeding 11 pounds in weight) to or from prisoners of war are entitled to transmission in the international mails free of postage.

Must be Plainly Addressed.—All mail shall be plainly addressed to the prisoner of war, giving name, designation, and name of camp at which he is held, and be marked "prisoner of war mail, via New York." In addition it should bear the name and address of the sender, and in the case of parcel-post packages the relationship of the sender to the prisoner of war addressed should be clearly stated. Parcel-post packages for American prisoners in enemy countries may not be sent by organizations or societies, and only one such package per month may be sent to any one prisoner of war, the limit of weight for each package being 11 pounds. If more are received, the one apparently from the prisoner's next of kin will be forwarded and the others held in New York pending communication with the sender, with whose consent such excess packages may be forwarded to some other prisoner of war who, in that particular month, has received no package from any source. If such consent be not given, the packages will be returned to the sender.

Limited to Certain Articles.—Only the following articles may be included in packages sent to American prisoners of war:

Belts (not made of leather), brushes (hair, hand, tooth, shaving, and shoe), buttons, candy (hard), cigars, cigarettes, comb, crackers or biscuits, gloves (not made of leather), handkerchiefs, knife (pocket), needles and thread, pencils, pens, penholders, pins, pipes, safety razors and blades, shaving soap, powder or cream, scarf, shirts, shoe laces (not made of leather), smoking or chewing tobacco, soap (toilet), socks, sweaters, tooth powder (paste or liquid mouth wash), towels, underwear, personal photographs, periodicals published prior to beginning of the war.

All Mail Censored.—No communication will be permitted to contain any statement, allusion, or suggestion of a nature to be of assistance to an enemy or ally of an enemy, nor shall any statement therein contained relate to any commercial transactions.

All mail will be censored by the executive postal censorship committee in New York and will then be placed in pouches labeled to the American Red Cross central committee for prisoners of war, Berne, Switzerland.

OTTO PRAEGER,

Second Assistant Postmaster General.

—*Official Bulletin*, 27/2.

BIG GUNS OF AMERICAN MAKE ON BATTLE FRONTS.—American built ordnance of the latest type and heaviest caliber—10-inch, 12-inch and 14-inch rifles—are in service on the sector of the Western front held by the American Army and on the Italian front, it was learned at the War Department. The general belief has been that very few American heavy guns were in Europe.

The guns sent to Italy include 14-inch rifles, both of 45 and 50 caliber. The former was considered the most powerful naval weapon in existence until the commissioning of the British battleships of the *Queen Elizabeth* class, with 15-inch guns.

American experts still believe that the 14-inch 50 caliber rifle is harder hitting and more accurate even than the larger British weapon.

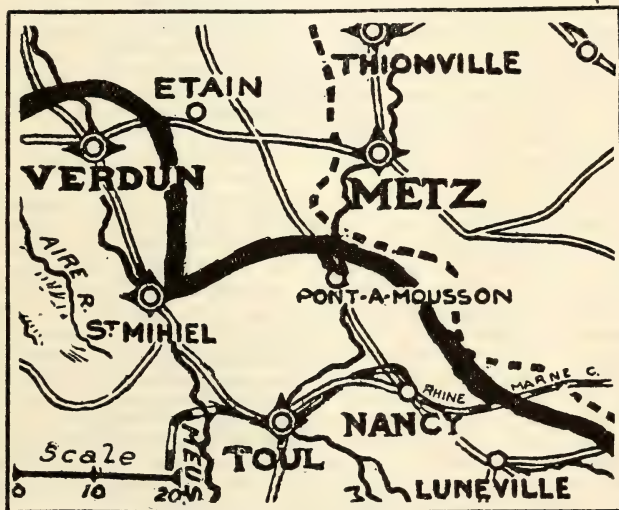
Reports from Italy say the results achieved by the heavy American ordnance already has elicited expressions of admiration from the Italian gunners.

In addition to heavy naval ordnance General Pershing has received reserve 12-inch rifles designed originally for installation in the coast defences of the United States. When this country entered the war there were a substantial number of these guns in American arsenals, but the chances of their being needed here was deemed so small that the War Department did not hesitate to ship them abroad. Mounted on specially designed carriages they are now along the American sector.

Mounted for high angle fire, as they will be when used in land operations, the 12-inch rifles have an estimated range of not less than 35,000 yards, or substantially 17 miles. The 14-inch gun has a proportionately greater range.

Larger naval guns are now being built, as future American battleships are to have 16-inch guns of both the 45 and 50 caliber. No details of this weapon have yet been permitted to be published, however.—*N. Y. Herald*, 26/2.

The authorized announcement, says the *New York Times*, which publishes this map, that American troops have taken over a sector of the



WHERE OUR TROOPS FIGHT IN FRANCE

French front northwest of Toul, indicates that they are holding a part of the line on the eastern side of the St. Mihiel salient. The exact location, for obvious reasons, cannot be disclosed as yet.—*Literary Digest*, 16/2.

FIRST AMERICAN BATTLEPLANES ON WAY ABROAD.—America's first contribution to the air equipment of the allied armies—modern battleplanes of the most advanced type, equipped with Liberty motors—is now on the way to France.

That announcement was authorized by Newton D. Baker, Secretary of War. The initial shipment marks the beginning of the fulfillment of the

huge aerial program laid out by the United States soon after the declaration of war. The productive stream has begun to move, and it is to be expected that henceforth it will flow in constantly increasing volume.

The difficulties that have been overcome, the problems that have been encountered are outlined in the War Department statement. In spite of these, the United States is somewhat ahead of the tentative program according to which American airplanes were not due in France until July.

The airplanes are equipped with the new Liberty motor, the 12-cylinder type, which now is being produced in quantities.—*N. Y. Herald*, 21/2.

JAPAN WANTS TO ENTER SIBERIA AND SAVE ARMY STORES.—Japan has directed inquiries to the Entente Powers and the United States Government to test their feeling toward a proposal to institute joint military operations in Siberia to save the vast quantities of war supplies stored at Vladivostok and along the Siberian Railroad. Criticism at home of the failure of Japan to play a larger part in the war is said to have been influential in bringing about the negotiations.

Officials here refuse to discuss this subject for publication, but it is understood that so far as America is concerned the proposal when first broached was not wholly acceptable, though the exchanges on the subject, which are still in progress, may result in modifying the government's attitude.

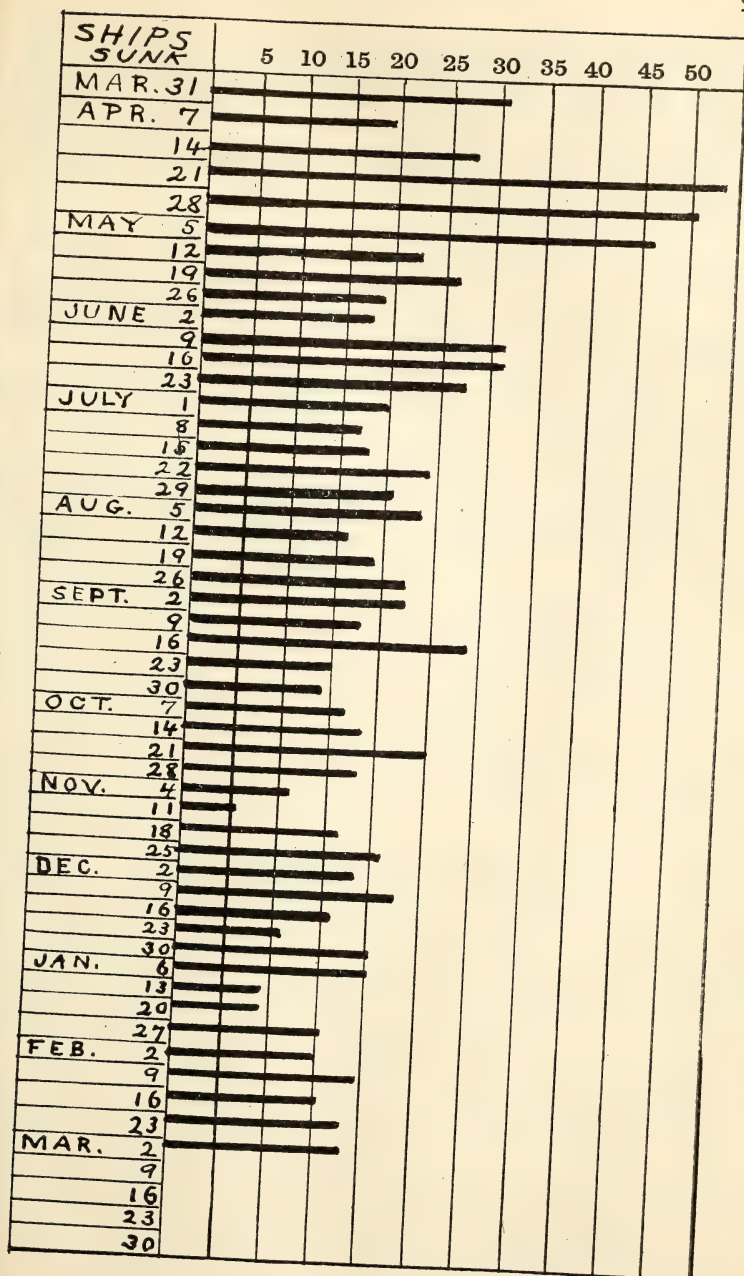
Accumulated at Vladivostok are military supplies of all kinds, much of American manufacture, and even greater quantities of Japanese origin, which were delivered long before the Bolsheviki took possession of the Russian Government. The Stevens commission of American engineers made extraordinary efforts to improve the facilities of the Siberian Railroad, so that these stores could be transported westward for the use of the Russian Army on the German and Austrian fronts. A good deal of accumulation was removed, but great quantities remain on the piers and in warehouses, and even in the open, both at Vladivostok and at points westerly on the railroad.

The material suffers greatly from deterioration through exposure to the weather and from other causes, but the principal matter of concern to the Allies is the danger that the stores shall fall into the hands of the Germans, who may make their delivery one of the conditions of any peace treaty which they are about to compel the Bolsheviki to sign.

This situation is regarded by the Japanese as warranting the adoption of some measures to secure these stores even if this involves military action on their part. They are quite willing to have the cooperation of the Entente forces and of American troops and sailors in this object, and the problem which is now occupying belligerent chancelleries is whether Japan shall be allowed to proceed single handed if a campaign in this quarter is begun or whether there shall be joint operations. Looking to the future, it has been argued that there should be a combination movement to avoid any such question as to the ultimate disposition of occupied territory in Siberia as might follow the exclusive entry of any one country.

From the tone of the discussion of this subject in official Washington it appears that while the Entente governments incline favorably to a joint campaign with Japan in Siberia they are faced with the obstacle that practically none of them has troops or ships available for an Asiatic campaign. This statement does not apply, however, to America, which not only has some powerful cruisers, with large crews and marine contingents, now in Asiatic waters, but in addition has about 20,000 troops in the Philippines and two full battalions, about 900 strong, in China, and on the railroad from where they could be sent quickly into Siberia.

While the whole American force would be insignificant compared to Japan's great naval and military resources at the scene, the participation of the American troops in the campaign would serve to maintain its international character.



ENGLISH MERCHANT SINKINGS

The Russian representatives in Washington strongly disapprove of any campaign in Siberia conducted under Japanese auspices, even though there be joint operations, urging the belief that the Bolsheviki elements struggling for control at Vladivostok and along the Siberian railroad will never permit the military stores to pass into German possession, and that they can be depended upon to prevent the seizure of railway stations by the German prisoners of war who are reported to have been given their liberty by the Siberian local authorities.—*N. Y. Herald*, 28/2.

INDEX OF WAR VESSEL LOSSES MENTIONED IN THIS NUMBER

NOTE.—A complete table of losses since the beginning of the war will be published semi-annually; the latest appears in the January number of the PROCEEDINGS.

BRITISH VESSELS

<i>Glenart Castle</i> (hosp. ship)	919, 924
<i>Calgarian</i> (aux. cruiser)	924
<i>E-14</i> (submarine)	930

UNITED STATES VESSELS

<i>Cherokee</i> (tug)	917
<i>Mariner</i> (tug)	917

RUSSIAN VESSELS

Transports	926
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GERMAN VESSELS

Submarines	920, 925, 927
<i>Igotz Mendi</i> (captured Spanish ship)	926
<i>Turritella</i> (captured English ship)	931

DIPLOMATIC NOTES

FROM FEBRUARY 18 TO MARCH 18

PREPARED BY

ALLAN WESTCOTT, PH. D., Instructor, U. S. Naval Academy

COUNT VON HERTLING ON PEACE PRINCIPLES

In words which might be given a favorable interpretation if borne out in practice, Count von Hertling on February 25 addressed the Reichstag on President Wilson's essential principles for a satisfactory peace. He expressed assent, with certain reservations, to these principles, but raised the objection that they were not fully endorsed by America's allies, and that the world at large was not ready for them. He invited separate proposals from Belgium, and again suggested a confidential meeting of diplomats of the opposing powers. The speech in full follows:

The Reichstag has a right to receive an explanatory statement in regard to the foreign situation and the attitude of the government concerning it. I will meet the obligation arising therefrom, even though I entertain certain doubts as to the utility and success of dialogues carried on by ministers and statesmen of belligerent countries.

Suggests "Intimate Meeting."—Mr. Runciman in the House of Commons recently expressed the opinion that we would get much nearer peace if, instead of this, responsible representatives of the belligerent powers would come together in an intimate meeting for discussion. I can only agree with him that that would be the way to remove numerous intentional and unintentional understandings and compel our enemies to take our words as they are meant, and on their part also to show their colors.

I cannot at any rate discover that the words which I spoke here on two occasions were received in hostile countries objectively and without prejudice. Moreover, discussion in an intimate gathering alone could lead to understanding on many individual questions which can really be settled only by compromise.

Invites Offer from Belgium.—It has been repeatedly said that we do not contemplate retaining Belgium, but that we must be safeguarded from the danger of a country, with which we desire after the war to live in peace and friendship, becoming the object or the jumping-off ground of enemy machinations. If, therefore, a proposal came from the opposing side, for example from the government in Havre, we should not adopt an antagonistic attitude, even though the discussion at first might only be unbinding.

Meanwhile it does not appear as if Mr. Runciman's suggestion has a chance of assuming tangible shape, and I must adhere to the existing methods of dialogue across the Channel and ocean.

Reply on Wilson Principles.—Adopting this method, I readily admit that President Wilson's message of February 11 represents, perhaps, a small step toward a mutual rapprochement. I, therefore, pass over the preliminary and excessively long declarations in order to address myself immediately to the principles, which, in President Wilson's opinion, must be applied in a mutual exchange of views.

The first clause says that each part of the final settlement must be based upon the essential justice of that particular case and upon such adjustments as are most likely to bring a peace that will be permanent.

Who would contradict this? The phrase, coined by the great father of the church, Augustine, 1500 years ago—"justitia fundamentum regnorum"—

is still valid to-day. Certain it is that only peace based in all its parts on the principles of justice has a prospect of endurance.

The second clause expresses the desire that peoples and provinces shall not be bartered about from sovereignty to sovereignty as if they were mere chattels and pawns in a game, even the great game, now forever discredited, of the balance of power.

This clause, too, can be unconditionally assented to. Indeed, one wonders that the President of the United States considered it necessary to emphasize it anew. This clause contains a polemic against conditions long vanished, views against cabinet politics and cabinet wars, against mixing state territory and princely and private property, which belong to a past that is far behind us.

Suggests Illusion by President.—I do not want to be discourteous, but when one remembers the earlier utterances of President Wilson, one might think that he is laboring under the illusion that there exists in Germany an antagonism between an autocratic government and a mass of people without rights.

And yet President Wilson knows (as, at any rate, the German edition of his book on the state proves) German political literature, and he knows, therefore, that with us princes and governments are the highest members of the nation as a whole, organized in the form of a state, the highest members, with whom the final decision lies. But, seeing that they also, as the supreme organs, belong to the whole, the decision is of such a nature that only the welfare of the whole is the guiding line for a decision to be taken. It may be useful to point this out expressly to President Wilson's countrymen.

Then finally at the close of the second clause the game of the balance of power is declared to be forever discredited. We, too, can only gladly applaud. As is well known, it was England which invented the principle of the maintenance of the balance of power in order especially to apply it when one of the states on the European continent threatened to become too powerful for her. It was only another expression for England's domination.

The third clause, according to which every territorial settlement involved in this war must be made in the interest and for the benefit of the populations concerned, and not as a part of any mere adjustment or compromise of claims among rival states, is the only application of the foregoing in a definite direction, or a deduction from it, and is therefore included in the assent given to that clause.

Now, in the fourth clause he demands that all well-defined national aspirations shall be accorded the utmost satisfaction that can be accorded them without introducing new or perpetuating old elements of discord and antagonism that would be likely in time to break the peace of Europe, and consequently of the world. Here, also, I can give assent in principle, and I believe, therefore, with President Wilson, that a general peace of such a basis is discussable.

Wilson "in Advance of Realities."—Only one reservation is to be made. These principles must not be proposed by the President of the United States alone, but they must also be recognized definitely by all states and nations. President Wilson, who reproaches the German Chancellor with a certain amount of backwardness, seems to me in his flight of ideas to have hurried far in advance of existing realities.

Certainly a League of Nations, erected upon justice and mutual unselfish appreciation, a condition of humanity in which war, together with all that remains of the earliest barbarism, should have completely disappeared and in which there should be no bloody sacrifices, no self-mutilation of peoples, no destruction of laboriously acquired cultural values—that would be an aim devoutly to be desired.

But that aim has not yet been reached. There does not yet exist a court of arbitration set up by all nations for the safeguarding of peace in the name of justice. When President Wilson incidentally says that the German

Chancellor is speaking to the court of the entire world, I must, as things stand to-day, in the name of the German Empire and her allies, decline this court as prejudiced, joyfully as I would greet it, if an impartial court of arbitration existed and gladly as I would cooperate to realize such ideals.

Unfortunately, however, there is no trace of a similar state of mind on the part of the leading powers in the Entente. England's war aims, as recently expressed in Lloyd George's speeches, are still thoroughly imperialistic and want to impose on the world a peace according to England's good pleasure. When England talks about peoples' right of self-determination, she does not think of applying the principle to Ireland, Egypt, or India.

Rejects Conquest Aim in Russia.—Declaring that the new German operations against Russia were taken at the request of the populations to restore order, and that they did not aim at conquest, the Chancellor continued:

Our war aims from the beginning were the defence of the Fatherland, the maintenance of our territorial integrity, and the freedom of our economic development. Our warfare, even where it must be aggressive in action, is defensive in aim. I lay especial stress upon that just now in order that no misunderstandings shall arise about our operation in the east.

After the breaking off of peace negotiations by the Russian delegation on February 10, we had a free hand as against Russia. The sole aim of the advance of our troops, which was begun seven days after the rupture, was to safeguard the fruits of our peace with Ukraine. Aims of conquest were in no way a determining factor. We were strengthened in this by the Ukrainians' appeal for support in bringing about order in their young state against the disturbances carried out by the Bolsheviks.

If further military operations in other regions have taken place, the same applies to them. They in no way aim at conquest. They are solely taking place at the urgent appeals and representations of the populations for protection against atrocities and devastation by red guards and other hands. They have, therefore, been undertaken in the name of humanity. They are measures of assistance, and have no other character. It is a question of creating peace and order in the interest of peaceable populations.

We do not intend to establish ourselves, for example, in Esthonia or Livonia. In Courland and Lithuania our chief object is to create organs of self-determination and self-administration. Our military action, however, has produced a success far exceeding the original aim.

News was received yesterday that Petrograd had accepted our conditions and had sent its representatives to Brest-Litovsk for further negotiations. Accordingly, our delegates traveled thither last evening. It is possible that there will still be dispute about the details, but the main thing has been achieved. The will to peace has been expressly announced from the Russian side, while the conditions have been accepted and the conclusion of peace must ensue within a very short time.

To safeguard the fruits of our peace with Ukraine, our army command drew the sword. Peace with Russia will be the happy result.

With regard to Rumania, too, the guiding principle will be that we must, and desired to, convert into friends the states with which on the basis of the success of our army we now conclude peace.

Peace negotiations with Rumania began at Bucharest yesterday. It appeared necessary that Secretary von Kùhumann should be present there during the first days when the foundations were laid. Now, however, he will presumably soon go to Brest-Litovsk. It is to be remembered regarding negotiations with Rumania that we are not taking part in them alone, and are under obligation to champion the interests of our allies, Austria-Hungary, Bulgaria, and Turkey, and to see to it that a compromise is arranged there regarding any divergent desires that will possibly give rise to difficulties, but these difficulties will be overcome.

I will say a word regarding Poland, in behalf of whom the Entente and President Wilson have recently appeared specially to interest themselves, as a well-known country liberated from oppressive dependence on Czarist

Russia by the united forces of Germany and Austria-Hungary, for the purpose of establishing an independent state, which, in unrestricted development of its national culture, shall at the same time become a pillar of peace in Europe.

The constitutional problem—in the narrower sense the question what constitution the new state shall receive—could not, as is easily understood, be immediately decided, and is still in the stage of exhaustive discussions between the three countries concerned. A fresh difficulty has been added to the many difficulties which have in this connection to be overcome, difficulties especially in the economic domain in consequence of the collapse of old Russia. This difficulty results from the delimitation of the frontier between the new state and adjacent Russian territory. For this reason the news of peace with the Ukraine at first evoked great uneasiness in Poland. I hope, however, that with good-will and proper regard to the ethnographical conditions a compromise on the claims will be reached. The announced intention to make a serious attempt in this direction has greatly calmed Polish circles.

In the regulation of the frontier question only what is indispensable on military grounds will be demanded on Germany's part.

The Entente are fighting for the acquisition of portions of Austro-Hungarian territory by Italy and for the severance of Palestine, Syria, and Arabia from the Turkish Empire. England hopes by the creation of a dependent protectorate to annex new portions of territory to the British Empire and to increase and round off the British possessions, especially in Africa.

In the face of this policy Entente statesmen dare to represent Germany as the disturber of peace, who, in the interest of world peace, must be confined within the narrowest bounds. By a system of lies and calumny they endeavor to instigate their own people and neutral countries with the spectre of the violation of neutrality by Germany.

Regarding the intrigues recently carried on in Switzerland we never thought, nor will we think, of assailing Swiss neutrality. We are much indebted to Switzerland. We express gratitude to her, Holland, the Scandinavian countries and Spain, which by her geographical position is exposed to especial difficulties, and no less to the extra-European countries which have not entered the war, for their manly attitude in that, despite all temptations and oppressions, they preserve their neutrality.

The world is longing for peace, but the governments of the enemy countries are again inflaming the passion for war. There are, however, other voices to be heard in England; it is to be hoped that these voices will multiply.

The world yearns for peace and desires nothing more than that the sufferings of war under which it groans should come to an end. But the governments of the enemy states contrive ever anew to stir up the war fury among their peoples. A continuation of the war to utmost was, so far as has transpired, the most recent watchword issued by the Conference of Versailles, and in the English Premier's speeches it again finds loud echo. There are, however, other voices to be heard in England; it is to be hoped that these voices will multiply.

Our people will hold out further, but the blood of the fallen, the agonies of the mutilated and the distress and sufferings of the peoples will fall on the heads of those who insistently refuse to listen to the voice of reason and humanity.

SPEECH ONLY A "POLITICAL GAME."—The Hague, March 1.—The annexationist *Weser Zeitung*, commenting on von Hertling's speech, remarks that the Chancellor's words indicate descending one step of the ladder of the old Bethmann-Hollweg policy, but expresses the hope that as the situation of Germany at present is much more favorable, Hertling's formula may be

considered as merely a political means and not as an expression of the whole nation.

"If it were otherwise," says the paper, "the Chancellor would have to count on opposition from the best and truest, as he seems to have forgotten his words about the continuation of the fight."

The paper says that the Chancellor does not mention the dangers of invasion nor the question of indemnities for "countless sacrifices," nor the settlement of evacuated territories with German inhabitants, but argues that this defensive speech is probably only a political game like Wilson's peace talk. It asserts that this policy is certainly not dangerous in the east, but holds that the Chancellor's speech creates uncertainty as to the west, as by declaring a lack of intention of annexing Belgium he releases a valuable pawn. The paper holds that, everything considered, it is questionable whether Hertling brought peace any nearer.

"The Chancellor," it says, "approves Wilson's four points merely to play them against other members of the Entente."

The *Zeitung* concludes that only by the use of the sword in the east and the west will peace willingness be created, and that talk is useless in view of the big offensive expected in the west.—*N. Y. Times*, 2/3.

BALFOUR SEES NO PEACE BASIS.—London, February 27.—Foreign Secretary Balfour, replying in the House of Commons to the speech of Count von Hertling, regarding the doctrine of the balance of power, said that until German militarism had become a thing of the past, and there was in existence a hall or court armed with executive powers making the weak as safe as the strong, it would never be possible to ignore the principles underlying the struggle for the balance of power.

Mr. Balfour told the House that he was unable to find in von Hertling's speech any basis for fruitful conversation or hope for peace. The Chancellor's attitude concerning Belgium, said Mr. Balfour, was completely unsatisfactory, and his lip service to President Wilson's proposition was not exemplified in German practice.

Belgium the Touchstone.—Mr. Balfour declared Count Hertling's reference to Belgium to be unsatisfactory to everybody—except Richard Holt, a Radical M. P.—and continued:

"Many questions must be settled at the peace conference, but the question of Belgium is the best touchstone of the honesty of purpose of Central European diplomacy, and especially of German diplomacy. There is only one course for the offending nation in this case, namely, unconditional restoration and reparation.

"When was Belgium the jumping off ground of enemy machinations and why should Germany suppose it is going to be? Belgium has been the victim, not the author, of these crimes, and why should she be punished because Germany is guilty? Germany always had in mind new territorial, commercial or military conditions which would prevent Belgium from taking an independent place among the nations, which Germany and ourselves were pledged to preserve.

"What we have to consider is how far von Hertling's lip service to President Wilson's four propositions really is exemplified by German practice."

The Foreign Secretary then analyzed the four Wilson propositions and von Hertling's attitude concerning them, as well as the Chancellor's frame of mind regarding Alsace-Lorraine. He said:

"I could understand a German taking a different view from the view of the French, British, Italian, or American Government, but not a German discussing the principles of essential justice and saying: 'There is no question of Alsace-Lorraine to go before a peace conference.'

"Regarding President Wilson's second proposition, we have had within the last few weeks a specimen of how von Hertling interprets in action the principle he so glibly approves in theory. To take one instance only, there

is the cession of Polish territory to the Ukraine. We would like to know how the Germans came to make this gross violation of their principle.

Turkey and Palestine.—"Coming to the third proposition, von Hertling says, with justice, that the doctrine of the balance of power is a more or less antiquated doctrine. He further accuses England of being the upholder of that doctrine for purposes of aggrandizement. That is a profoundly unhistorical method of looking at the question. Great Britain has fought time and again for the balance of power, because only by fighting could Europe be saved from the domination of one overbearing and aggressive nation.

"If von Hertling wants to make the balance of power antiquated, he can do it by inducing his countrymen to abandon that policy of ambitious domination which overshadows the world at this moment.

"As to President Wilson's third and fourth principles: Consider for a moment how von Hertling desires to apply the principle that the interest and benefit of the populations concerned should be considered in peace arrangements. He mentions three countries he wishes to see restored to Turkey, namely, Armenia, Palestine, and Mesopotamia.

"Does any one think that this would be to the interest and benefit of the populations concerned? Von Hertling accuses us of being animated with purely ambitious designs when we invaded Mesopotamia and captured Jerusalem. I suppose he would say that Russia was similarly moved when she occupied Armenia. But when Turkey went to war she picked a quarrel with us for purely ambitious purposes. She was promised by Germany the possession of Egypt. Would the interest and happiness of the population of Egypt be best conserved by Turkish conquest of Egypt?

"The Germans in the search for the greatest happiness of these populations would have restored Egypt to the worst rule the world has ever known. They would have destroyed Arab independence and abandoned Palestine to those who had rendered it sterile all these centuries.

"How could any one preach seriously a profession of faith about the interests of populations after this evidence of the manner in which von Hertling desired to see it carried out? If the Reichstag had any sense of humor it must surely have smiled when it heard the Chancellor dealing in that spirit with the dominating doctrine of every important German statesman, soldier, and thinker for two generations at least.

"So much for the four principles which Mr. Holt says von Hertling accepts, and which he thinks the British Government is backward in not accepting. I hope my short analysis may have convinced him that there are two sides to that question."—*N. Y. Times Current History*, April.

Lord Robert Cecil, Minister of Blockade, referring to the von Hertling speech, said:

"It would be foolish to enter into negotiations unless there were a reasonable prospect of success. We do not desire to repeat the experiment of the Brest-Litovsk negotiations."—*N. Y. Times*, 28/2.

RUSSIA MAKES PEACE WITH CENTRAL POWERS

Following Trotzky's abandonment of negotiations at Brest-Litovsk in January, and immediately upon the expiration of the armistice on February 18, German forces crossed the Dvina River and advanced toward Petrograd, capturing the port of Reval and occupying the Russian Baltic provinces not already under their control. At the same time both Germany and Austria sent troops to assist the bourgeois government of Ukraine in driving out the Bolsheviks, and announced on March 2 the "liberation" of Kiev.

On February 19, Lenine and Trotzky despatched a wireless message of capitulation in the following terms:

The Council of Peoples' Commissaries protests against the fact that the German Government has directed its troops against the Russian Councils' republic which has declared the war was at an end and which is demobilizing its army on all fronts.

The Workmen's and Peasants' Government of Russia could not anticipate such a step because neither directly nor indirectly has any one of the parties which concluded the armistice given the seven days' notice required in accordance with the treaty of December 15 for terminating it.

The Council of People's Commissaries in the present circumstances regards itself as forced formally to declare its willingness to sign a peace upon the condition which had been dictated by the delegations of the Quadruple Alliance at Brest-Litovsk.

The Council of People's Commissaries further declares that a detailed reply will be given without delay to the conditions of peace as proposed by the German Government.

(Signed) FOR THE COUNCIL OF PEOPLE'S COMMISSARIES:

LENINE,
TROZKY.

This was followed, on request from General Hoffman in command of the German forces, by a messenger bearing a copy of the message with Lenine's and Trotzky's signatures.

The German advance, however, continued, encountering little active resistance, in spite of a series of proclamations from the Lenine Government, on February 21 and later, calling for "war to the death." According to approximate estimates, the captures included 6800 officers, 57,000 men, 2400 guns, 5000 machine guns, and large quantities of munitions and railroad supplies. The advance extended at one point to Jamburg, on the Reval-Petrograd line 68 miles from the capital. It did not stop till the peace treaty was signed.

On February 23, Germany again laid down her terms to Russia, to which the Petrograd council agreed. A Russian delegation went to Brest-Litovsk and without effort to debate signed the treaty on March 3, subject to ratification by the All-Russian Congress of Councils of Workmen's, Peasants', and Cossacks' Delegates within two weeks. The German terms were, in brief, as follows:

By this treaty Russia is forced to accede to the ultimatum of the Central Powers made on February 21, and in addition must cede to Turkey lands taken from her in the wars of 1828-9, 1854-5, 1877-8, and in the present war. The terms in detail include the following provisions:

(1) The surrender of Courland, Poland, and Lithuania, except part of the Province of Grodno, and Russia's renunciation of every claim to intervention in the internal affairs of these regions.

(2) The evacuation of Livonia and Esthonia, these provinces to be policed by Germany until "the constitution of the respective countries shall guarantee their social security and political order."

(3) Russia to conclude peace with the Ukraine.

(4) Russian troops and Red Guards to evacuate the Ukraine and Finland.

(5) Immediate and complete demobilization of the Russian Army.

(6) Russian warships to be disarmed or kept in Russian harbors until the conclusion of peace; warships of the Entente in Russian waters to be treated likewise.

(7) Merchant navigation of the Black and Baltic seas to be renewed, mines to be cleared away promptly, the blockade of the Arctic Ocean to remain in force until a general peace.

(8) Free export of ores without tariff from Russia and other wide commercial concessions.

(9) Russia to promise not to attempt Bolshevik propaganda in Teuton territory.

An indemnity variously reported at \$1,500,000,000 and \$4,000,000,000 was added.—*N. Y. Nation*, 7/3.

TEXT OF TREATY

Article 1.—The Central Powers and Russia declare the state of war between them to be terminated, and are resolved henceforth to live in peace and friendship with one another.

Article 2.—The contracting nations will refrain from all agitation or provocation against other signatory governments and undertake to spare the populations of the regions occupied by the powers of the quadruple entente.

Article 3.—The regions lying west of the line agreed upon by the contracting parties, an formerly belonging to Russia, shall no longer be under Russian sovereignty. It is agreed that the line appears from the appended map, No. 1, which, as agreed upon, forms an essential part of the peace treaty. The fixing of the line in the west will be settled in the German-Russian mixed commission. The regions in question will have no obligation whatever toward Russia arising from their former relations thereto. Russia undertakes to refrain from all interference in the internal affairs of these territories and to let Germany and Austria determine the future fate of these territories in agreement with their populations.

Article 4.—Germany and Austria agree, when a general peace is concluded and Russian demobilization is fully completed, to evacuate the regions east of the line designated in Article 3, No. 1, in so far as Article 6 does not stipulate otherwise. Russia will do everything in her power to complete as soon as possible the evacuation of the Anatolian provinces and their orderly return to Turkey. The districts of Erivan, Kars, and Batum will likewise without delay be evacuated by the Russian troops. Russia will not interfere in the reorganization of the constitutional or international conditions of these districts, but leave it to the populations of the districts to carry out the reorganization in agreement with the neighboring states, particularly Turkey.

Article 5.—Russia will without delay carry out the complete demobilization of her army, including the forces newly formed by the present government. Russia will further transfer her warships to Russian harbors and leave them there until a general peace or immediately disarm. Warships of states continuing in a state of war with the quadruple alliance will be treated as Russian warships in so far as they are within Russian control.

The barred zone in the Arctic continues in force until the conclusion of peace. An immediate beginning will be made of the removal of mines in the Baltic and in so far as Russian power extends in the Black Sea. Commercial shipping is free in these waters and will be resumed immediately. A mixed commission will be appointed to fix further regulations, especially for the announcement of routes for merchant ships. Shipping routes are to be kept permanently free from floating mines.

Article 6.—Russia undertakes immediately to conclude peace with the Ukrainian People's Republic and to recognize the peace treaty between this state and the powers of the quadruple alliance. Ukrainian territory will be immediately evacuated by the Russian troops and the Russian Red Guard. Russia will cease all agitation or propaganda against the government or the public institutions of the Ukrainian People's Republic.

Estonia and Livonia will likewise be evacuated without delay by the Russian troops and the Russian Red Guard.

The eastern frontier of Esthonia follows in general the line of the Narova River. The eastern frontier of Livonia runs in general through Peipus Lake and Pskov Lake to the southeasterly corner of the latter, then over Lubahner (Luban) Lake in the direction of Lievenhof, on the Dvina.

Esthonia and Livonia will be occupied by a German police force until security is guaranteed by their own national institutions and order in the state is restored. Russia will forthwith release all arrested or deported inhabitants of Esthonia and Livonia and guarantee the safe return of deported Esthonians and Livonians.

Finland and the Aland Islands will also forthwith be evacuated by the Russian troops and the Red Guard, and Finnish ports by the Russian fleet and Russian naval forces.

So long as the ice excludes the bringing of Russian warships to Prussian ports only small detachments will remain behind on the warships. Russia is to cease all agitation or propaganda against the government or the public institutions in Finland.

The fortifications erected on the Aland Islands are to be removed with all possible dispatch. A special agreement is to be made between Germany, Russia, Finland, and Sweden regarding the permanent non-fortification of these islands, as well as regarding their treatment in military, shipping, and technical respects. It is agreed that at Germany's desire the other states bordering on the Baltic are also to be given a voice in the matter.

Article 7.—Starting from the fact that Persia and Afghanistan are free and independent states, the contracting parties undertake to respect their political and economic independence and territorial integrity.

Article 8.—Prisoners of war of both sides will be sent home.

Article 9.—The contracting parties mutually renounce indemnification of their war costs—that is to say, state expenditure for carrying on the war, as well as indemnification for war damages—that is to say, those damages which have arisen for them and their subjects in the war regions through military measures, inclusive of all requisitions undertaken in the enemy country.

Article 10.—Diplomatic and consular relations between the contracting parties will be resumed immediately after notification of the peace treaty. Special agreements are reserved relative to the admittance of the respective consuls.

Article 11.—The prescriptions contained in Appendices 2 to 5 shall govern the economic relations between the powers of the quadruple alliance and Russia—namely, Appendix 2 for German-Russian, Appendix 3 for Austro-Hungarian-Russian, Appendix 4 for Bulgarian-Russian, and Appendix 5 for Turkish-Russian relations.

Article 12.—The restoration of public and private relations, the exchange of prisoners of war, interned civilians, the amnesty question, as well as the treatment of merchant ships which are in enemy hands will be regulated by separate treaties with Russia, which shall form an essential part of the present peace treaty, and as far as is feasible shall enter into force at the same time.

Article 13.—For the interpretation of this treaty the German and Russian text is authoritative for the relations between Germany and Russia; for the relations between Austria-Hungary and Russia, the German, Hungarian, and Russian text; for the relations between Bulgaria and Russia, the Bulgarian-Russian text; for the relations between Turkey and Russia, the Turkish and Russian text.

Article 14.—The present peace treaty will be ratified. Instruments of ratification must be exchanged as soon as possible in Berlin. The Russian Government undertakes at the desire of one of the quadruple alliance powers to exchange ratifications within two weeks. The peace treaty enters into force on its ratification, in so far as its articles, appendices, or supplementary treaties do not prescribe otherwise.—*N. Y. Times Current History*, April.

EMPEROR WILLIAM'S CONGRATULATIONS.—Emperor William, according to another official announcement, has sent a telegram to Count von Hertling, the German Imperial Chancellor, reading as follows:

"The German sword, wielded by great army leaders, has brought peace with Russia. With deep gratitude to God, who has been with us, I am filled with proud joy at the deeds of my army and the tenacious perseverance of my people. It is of especial satisfaction to me that German blood and German Kultur have been saved. Accept my warmest thanks for your faithful and strong cooperation in the great work."—*N. Y. Times*, 5/3.

PRESIDENT WILSON TO RUSSIAN CONGRESS.—On March 11, President Wilson addressed a message of friendship and encouragement to the All-Russian Congress about to assemble at Moscow. This message was regarded as expressing the feeling of the United States Government that the Allies should not abandon Russia and the assurance that Russia might depend on the consistent friendship of this country. The text follows:

WASHINGTON, March 11.

"May I not take advantage of the meeting of the Congress of the Soviets to express the sincere sympathy which the people of the United States feel for the Russian people at this moment when the German power has been thrust in to interrupt and turn back the whole struggle for freedom and substitute the wishes of Germany for the purpose of the people of Russia?"

"Although the government of the United States is, unhappily, not now in a position to render the direct and effective aid it would wish to render, I beg to assure the people of Russia through the congress that it will avail itself of every opportunity to secure for Russia once more complete sovereignty and independence in her own affairs and full restoration to her great rôle in the life of Europe and the modern world.

"The whole heart of the people of the United States is with the people of Russia in the attempt to free themselves forever from autocratic government and become the masters of their own life."

(Signed) WOODROW WILSON.

The message was telegraphed to the American Consul General at Moscow for delivery to the congress.

This message was received favorably by the Russian Congress and on March 14 was answered in characteristic fashion as follows:

The All-Russian Congress of Soviets expresses its appreciation to the American people and, first of all, the laboring and exploited classes in the United States for the message sent by President Wilson to the Congress of Soviets, in this time when the Russian Socialist Soviet Republic is living through most difficult trials.

The Russian Republic uses the occasion of the message from President Wilson to express to all peoples who are dying and suffering from the horrors of this imperialistic war its warm sympathy and firm conviction that the happy time is near when the laboring masses in all bourgeois countries will throw off the capitalist yoke and establish a Socialist state of society, which is the only one capable of assuring a permanent and just peace as well as the culture and well-being of all who toil.

SOVIET CONGRESS RATIFIES PEACE.—The All-Russian Congress of Soviets, meeting at Moscow on March 14, ratified by a vote of 453 to 30 the peace treaty with the Central Powers. Only slightly more than half the delegates expected to attend the Congress were reported as voting. The Congress adjourned on March 16, after passing a resolution for organizing the defence of the country by creating a national army of both sexes.

The independent government established in the Caucasus at the same time issued a statement refusing to surrender Kars, Batoum, and Ardahan to Turkey, as provided in the Brest-Litovsk Treaty, and stating that the Caucasus had sent delegates to negotiate with Turkey at Trebizond.

THE BOLSHEVIK DILEMMA.—Petrograd, March 11.—Premier Lenine and the other People's Commissaries left for Moscow last night. Petrograd is to be governed by a special committee headed by Zinoviev and nominated by the Petrograd Soviet. The work of this committee will be to maintain order and defend the approaches to Petrograd. The president of the military organization is Leon Trotzky, who had resigned his post as Commissary for Foreign Affairs, and will not attend the Moscow Congress.

The peace party headed by Lenine, now, obviously, has got the upper hand. Not, I imagine because any one, even among the most infatuated Bolsheviks, regards peace as tolerable or in the least degree final, but because a continuation of hostilities against the Germans at the present moment would be suicidal for the Bolshevik Government. They could not seriously fight. They would have to beat a precipitate retreat, with the certainty of being compelled ultimately to submit to a still more humiliating and destructive peace.

So far Lenine's logic is absolutely convincing. His argument from a contrast between the first and second Brest-Litovsk Conference is irrefutable, but then the position after peace is concluded will be hardly less difficult. Every clause of the peace treaty bristles with danger for the Bolsheviks. Lenine talks of a breathing space, and has outlined a program of further communist reforms to be put into execution when the war finally stops. But the execution of this program is incompatible with the practical fulfillment of the peace treaty. The financial and economic obligations imposed by Germany on Russia simply cannot be carried out under the present communal régime. Conflicts are inevitable as soon as the Germans come in and begin trading with Russia.

The peace terms will be enforced at the bayonet's point, and Socialist absolutism will no longer be possible.

This is why the war party do not rest. They know that a conflict with the Germans in some form is inevitable. For the sake of their Socialist aims they are driven into an attitude of bitter hostility to the Germans. They now regard the Germans as the chief enemy, and they are infusing into the masses a strong anti-German feeling.—*Harold Williams*.—*N. Y. Times*, 11/3.

GERMANY IN FINLAND

GERMANY OCCUPIES ALAND ISLANDS.—On February 24, it was announced from Stockholm that Sweden had sent 500 troops to maintain order in the Aland Islands, which control the entrance to the Gulf of Bothnia. Professor Eden, the Swedish Premier, stated that the measure was only temporary, and was in accordance with an agreement between the warring "Red" and "White Guard" factions in the islands.

That Sweden's move was merely temporary was shown by the news, on March 4, that German forces had seized the islands, as a preliminary move to the despatch of troops to Finland. Sweden, according to this despatch, protested against the Aland Islands being placed in the war zone; and her vital interest in the islands, together with the presence of her troops there, suggested the possibility of friction with Germany.



HOW THE GERMANS ARE CARVING UP RUSSIA

The German Government has already arranged for the severance in some form of Russian territory of 524,600 square miles with a population of 66,100,000. Various excuses and explanations of this work are given. Some provinces are to "self-determine" their own form of government. Others are to be given outright to the "Ukraine People's Republic," and Rumania has been notified that in consideration of signing a peace treaty she may give up the mouth of the Danube to Bulgaria and take Bessarabia from Russia. About one-fourth the total area of Russia, containing more than one-third the population, is thus taken from her. Should Germany succeed in her project these states in some form or other will, of course, be suzerainties of the Fatherland.—*Baltimore Star*, 1/3.

GERMANY AND SWEDEN.—London, March 10.—Germany's dealings with Finland thus far seem to be designed to make Finland a minor German kingdom, with the Emperor's son, Prince Oscar, on the throne, and to make another Heligoland of the Aland Islands. This scheme is a direct blow against Sweden, and, in a less degree, against Denmark and Norway, and is in line with the German Emperor's boast that the Baltic lands have been made permanently German.

The Aland Islands, geographically, are as much a part of Sweden as Newfoundland is of Canada. Throughout the war Sweden has been troubled by the fear that Russia would take them. Germany now occupies the islands temporarily, but the German flag flies over the public buildings, and no one believes that it will ever come down except by force.

The most practical effect of German control of Finland and the Aland Islands is pointed out by Reventlow, who says that they will no longer be used as a commercial bridge between Scandinavia and Russia. This is a bar to American as well as British trade with Russia.

That the Scandinavian countries have been overfriendly to the Entente came here as an amusing charge. Sweden has been generally rated the most pro-German of the neutral European nations, except possibly Spain. The royal family, the aristocracy, the universities, and the army have been outspokenly pro-German.

For a long time it was feared that Sweden would join the Germanic alliance. According to one newspaper, 55 per cent of the steel Germany has used for munitions has been furnished by Sweden.

Denmark has never been considered overfriendly to the Entente, but considering the fact that she is a small nation living under the muzzles of the German guns and with the mailed fist at her throat, the fact that she is leaning backward in maintaining her neutrality toward the Entente countries is understood to have caused no ill-feeling.

The latest German move appears to be a familiar one. Germany feels that she is now in a position where she is so strong in the north that she need no longer cultivate the friendship of the Scandinavian countries, and that she may make whatever damaging arrangements she desires and threaten them.

The *Cologne Gazette*, in commenting on the Swedish press editorials regarding the occupation of the Aland Islands, says:

"The Swedes have no cause for complaint. They reap simply the result of their policy of overprudence during the war."—*N. Y. Times*, 10/3.

GERMAN TREATY WITH FINLAND.—According to a London rumor of March 8, the Finnish Government had offered the throne of that country to Prince Oscar, fifth son of Emperor William. Prince Oscar is in his 30th year.

An Amsterdam despatch of March 7 stated that a treaty had been signed on March 7 between Germany and Finland containing the following terms: "Article 1 declares that no state of war exists between Germany and Finland; that the contracting parties are resolved henceforth to live in peace and friendship, and that Germany will exert herself to secure recognition by all the powers of Finland's autonomy and independence. On the other hand, Finland will cede no portion of her territory to a foreign power nor grant such power any easement on territory over which she is sovereign without previously coming to an understanding with Germany on the subject."

The following articles relate to the resumption of diplomatic and consular relations immediately after the ratification of the peace treaty, renunciation by each party by compensation for war costs and indemnities, restoration of state treaties and private rights, exchange of prisoners of war and interned civilians, and compensation for civil damages.—*N. Y. Times*, 9/3.

RUMANIA FORCED TO PEACE WITH CENTRAL POWERS

Despatches of February 28 stated that Count Czernin had communicated to Rumania the peace terms offered by the Central Powers and had granted King Ferdinand a short time to consider them.

Negotiations were soon afterwards begun at Bufftea, near Bucharest, and a preliminary treaty was signed on March 5. This treaty forced Rumania to surrender the territory of Dobrudja including her Black Sea coast as far north as the Danube; to permit a "rectification" of her Austro-Hungarian frontier for "strategic reasons"; to demobilize her army, and to allow transport of troops of the Central Powers through her territories to Ukraine. The terms follow in summary form:

"I. Rumania cedes to the Central Allied Powers Dobrudja as far as the Danube.

"II. The powers of the Quadruple Alliance will provide and maintain a trade route for Rumania by way of Constanza to the Black Sea.

"III. The frontier rectifications demanded by Austria-Hungary on the frontier between Austria-Hungary and Rumania are accepted in principle by Rumania.

"IV. Economic measures corresponding to the situation are conceded in principle.

"V. The Rumanian Government undertakes to demobilize immediately at least eight divisions of the Rumanian Army. Control of the demobilization will be undertaken jointly by the upper command of Field Marshal von Mackensen's army group and the Rumanian chief army command. As soon as peace is restored between Russia and Rumania the remaining parts of the Rumanian Army also will be demobilized in so far as they are not required for security service on the Russo-Rumanian frontier.

"VI. The Rumanian troops are to evacuate immediately the territory of the Austro-Hungarian monarchy occupied by them.

"VII. The Rumanian Government undertakes to support with all its strength the transport of troops of the Central Powers through Moldavia and Bessarabia to Odessa.

"VIII. Rumania undertakes immediately to dismiss the officers of the powers who are at war with the Quadruple Alliance still in the Rumanian service. The safe conduct of these officers is assured by the Quadruple Alliance. This treaty enters into operation immediately."

GERMANY'S EASTERN OPENING.—The treaty with Rumania was received with joy in Germany and Austria, it being hailed as the "oil peace" while that with Ukraine was the "bread peace."

Among allied diplomats the terms forced on Rumania by Count Czernin were considered a sufficient commentary on his previous sentiments for a liberal peace. Interest centered rather in the possibilities opened to Germany by control of the Black Sea. With this route at her disposal, and control of the Trans-Caucasian railway surrendered by Russia to Turkey, Germany would have a road to India other than the Bagdad line, and might stir in Great Britain the same fears (largely groundless) that Russia caused in the past. Naturally, however, the difficulties of this route and the excentric character of an offensive along it, would make its usefulness to Germany entirely dependent on a successful issue in the west.

SPAIN

SPAIN GROWS PEEVISH.—The calm persistence with which Germany continues to violate the neutrality of Spain is at last beginning to react upon all except the most pro-German of the Spaniards. Within a month German submarines sank no less than six Spanish vessels in spite of vigorous protests made to Berlin. The Madrid *Imparcial* says: "The persistence of the submarines is exhausting our patience. We receive, in spite of the gratitude which is our due, the same treatment as an enemy power." Discussing the latest sinking, the *Liberal* writes in a tone of pained surprise: "We are confronted by another violation of international law. It is a criminal, brutal act, and deserves a virile protest from the whole country against the ingratitude and insults of Germany." The Madrid *Sol* is indignant that the press is so apathetic, and says:

"We know that any pro-German when asked about his feelings regarding the war usually protests that he is pro-Spanish. The pro-Germans have discovered in this love for Spain a convenient cushion on which to fall without hurting themselves, and claim a monopoly of solicitude for the dignity, honor, and interests of Spain. We awaited comments in the pro-German newspapers on the torpedoing of the *Giralda*, and found them merely interested in an entertainment at the German college attended by Prince Ratibor. Not a word about the outrage committed off Guardia by a German submarine against a Spanish coasting-vessel.

"In certain papers we can understand this attitude. They must obey their masters. But it is not so intelligible in others which a few months ago were full of indignation at a similar attack on our mercantile marine. These papers, formerly so angered, dare not say a word to-day. The reason of this is plain enough to those who are in the secret.

"We are condemned, it seems, to find people who approve of the destruction of our ships and the killing of our sailors. But that is not all. On the Emperor of Germany's birthday some Madrid churches officially prayed for him. They have not yet prayed that the torpedoing may continue, but that may come."—*Literary Digest*, 16/3.

SPANISH AGREEMENT RATIFIED UNDER WHICH SUPPLIES MAY BE SENT TO PERSHING'S FORCES; ALSO PROVIDES FRENCH CREDIT.—*U. S. in Return to Give Spain a Limited Amount of Needed Goods, with Guarantee That They Will Not Be Reshipped to Germany.*—The war trade board authorizes the following:

The negotiations between the United States and Spain for the conclusion of a commercial agreement have been brought to a successful conclusion. The war trade board has received word from Ambassador Willard that ratifications of the new agreement, which had been delayed a few days on account of the changes in the Spanish cabinet, were interchanged in Madrid Thursday afternoon. The agreement takes immediate effect.

Of a Three-Sided Character.—These negotiations have been of a three-sided character, dealing not only with the trade relations between the United States and Spain but also with arrangements for a French credit in Spain.

The American representatives have been able, in addition to securing considerable amounts of desired supplies for General Pershing's forces in Spain and satisfactorily arranging the problems of American exports and imports, to materially assist the French Government in securing a large credit in Spain to finance payments for the supplies which the republic draws from Spanish sources.

Free Export to Allies.—Under the agreement Spain permits free export to the Allies of pyrites, minerals, and manufactured wool, a concession of decided value to the Entente powers, and the export to the extent permitted by home requirements of various other commodities, in addition to the specific licensing of the supplies required by General Pershing. In return, the United States assures to Spain its necessary supplies of cotton and

petroleum, the amount of the monthly export of these commodities being fixed in the agreement at a figure which will cover the genuine Spanish requirements, but bar the possibility of German agents in Spain secretly buying up and hoarding a stock of cotton against the time of the conclusion of peace. Spain is granted other supplies to the extent that they can be spared after satisfying home requirements in the United States and providing for the needs of its associates in the war.

As has already been stated, special concessions have been made in regard to locomotives and railway material, which are required to increase the carrying capacity of the Spanish railway system, a measure of decided importance to America and its associates, which are drawing supplies from Spanish territory.

The agreement has been practically completed for some time, but as the Spanish Minister of Finance, whose signature was required to the agreement, was one of the ministers affected by the cabinet changes last week, ratification had been delayed until the new minister had been installed and had had opportunity to consider the final text.—*Official Bulletin*, 9/3.

THE SITUATION IN SPAIN.—Madrid despatches of February 21 stated that three notes relative to submarine sinkings had been forwarded to Germany. The first referred to the Italian S. S. *Duca di Genova* sunk February 10 in Spanish territorial waters; the second to the *Giralda* sunk January 28 while engaged in coastwise traffic; and the third to the loss of the *Ceferino* on February 13. Further indications of submarine activity against Spanish shipping were the sinking on February 22 of the Spanish vessel *Mar-Caspio* (2723 tons) on her way to New York with a cargo of cork, the loss of the *Neguire* (1859 tons) on the following day, and the announcement from Berne on March 2 that a Spanish ship had been sunk while under charter by the Swiss Government with a cargo of wheat for Switzerland.

The general elections in Spain on February 24 gave the Liberal Democrats 93 seats in Parliament; Dato Conservatives, 86; Romanones Liberals, 35; Republicans, 33. According to reports, Germanophile candidates were everywhere defeated. The Alhucemas Cabinet, which had been in office since the preceding April, resigned on February 28, owing to disagreement over a change of policy toward Germany. It was reconstructed with two changes, resigned again on March 8, and was again patched together on March 10.

An article by Dr. Dillon in the February *Nineteenth Century* spoke despairingly of the complete political apathy of the Spanish people. The country lay subject to the control of a junta in the Spanish Army. Labor conditions were slightly improved by the call for Spanish workmen in France.

THE NORTHERN NEUTRALS

EFFECT OF TRADE AGREEMENTS WITH SCANDINAVIA.—The trade agreement between the Allies and Norway provided that Norway should receive 10,000,000 bushels of wheat and rice and certain specified amounts of meat, cotton, wool, sugar, oil, lead, and other commodities. In return, she promised that no part of these imports should reach the Central Powers, and no food whatever except 28,000 tons of fish per annum.

Referring to the effect upon Germany, and the bitter attacks on the northern neutrals in the German press, the *N. Y. Times* of March 12 wrote as follows:

"What have the Central Powers lost? For a long time Germany was importing iron of fine quality from Sweden, receiving from that source, it is estimated, more than half of the quantity consumed in her munition factories. Norway sold to her food, nickel for torpedoes, and other metals. A daily meat train crossed the boundary from Denmark, and food of many kinds came in from Holland. These supplies are reduced by at least 75 per cent, owing mainly to the new agreements, although the neutrals now have not so much to sell. At the same time Germany sees 2,100,000 tons of Norwegian, Dutch, and Swedish shipping, about 400 vessels, chartered to our government or the Allies. Many of these will carry foodstuffs to Germany's foes in Europe, and some will release American ships for the transportation of troops to France.

"All of these countries—even Sweden, whose royal family, aristocracy, and army have been pro-German—must now expect Germany's hostility. How will it be shown? Warning has been given that their ships will be torpedoed. But this will not be a new manipulation of enmity, for nearly 1300 of their vessels have already been sunk; and several thousand sailors went down with them or were killed in life-boats. Norway lost 12 ships last month. There is complaint at Berlin that the Norwegian press 'minimizes German successes.' It has not minimized the destruction of 726 ships."—*N. Y. Times*, 12/3.

NETHERLANDS

DUTCH SHIPS TAKEN OVER BY ALLIES.—Washington, March 14.—The United States and Great Britain have notified Holland of their intention to take over Dutch ships in American and Entente ports on March 18, unless Holland is able to reach a definite agreement regarding the vessels by that time.

There are 2,000,000 tons of Dutch shipping, but only 600,000 will be seized next Monday. The remaining 1,400,000 tons in Dutch ports will not be touched. It is only the purpose to take over the 400,000 tons in American ports and the 200,000 tons in Entente ports.

The decision of the American and British Governments is based on the fact that this tonnage is vitally needed and the fact that Germany has refused to permit the Dutch Government to live up to the *modus vivendi* into which Holland recently entered.

The American Government and its co-belligerents have been influenced by the fact that Holland is obviously in a state of duress and has been so terrorized by the German submarine menace that she fears to put into effect the voluntary agreement with the Allies regarding the ships. This agreement provided for food supplies for Holland and contained other benefits for that country. It provided for the departure of Dutch ships now in Dutch waters to replace Dutch ships sailing from this side with supplies for Holland and for Belgian relief, a step for which the justification is obvious when it is considered that, otherwise, the Dutch ships now on this side of the Atlantic would gradually have been transferred to German control upon reaching harbors on the other side which can be largely sealed up by German submarines.—*N. Y. Times*, 15/3.

HOLLAND OFFERS TO GIVE UP SHIPS.—Holland, on the eve of her shipping being taken over by the United States and Great Britain, has given evidences of a readiness to make a voluntary agreement to that purpose, even agreeing that the ships shall be sent through the war zone.

In view of the continued pressure upon the Netherlands by Germany in opposition to such a step, officials here were mystified at the sudden change in the situation.

It was stated that Holland probably would make liberal concessions to Germany, but it was feared that the sudden acquiescence with the long-opposed provision that the ships be sent through the war zone might indi-

cate that the Netherlands Government was proposing something new in connection with the negotiations which Great Britain and the United States would be unable to accept.

It was stated that if Holland desires to turn over the ships on the terms already laid down, by voluntary agreement, it would be considered very agreeable, but that they must be taken over Monday on the final terms presented by the American and British diplomatic representatives.—*Washington Post*, 17/3.

GERMANY

GERMANY'S HUGE DEBT.—The financial status of Germany was clearly analyzed by Professor E. L. Bogert, of the University of Illinois, in the *N. Y. Times* of March 14. Between August 1, 1914, and December 1, 1917, the Reichstag had granted ten votes of credit appropriating money for the use of the government, aggregating 109,000,000,000 marks or \$27,000,000,000. The recent vote of an additional 15,000,000,000 marks brought the total to \$31,000,000,000.

Since a small part of this expenditure has been met by taxation, a better indication of the war debt is given by the loans negotiated by the Imperial Government. These, occurring with clock-like regularity every March and September, have been ten in number, amounting in all to \$18,340,415,000. Of the discrepancy of 12½ billion dollars between these loans and the expenditures, not more than one billion can be accounted for by taxation, leaving between 11 and 12 billion dollars of floating debt.

While these figures make it evident that the imperial debt of Germany has not yet reached the sum of 124,000,000,000 marks, it is evident that it has already passed the limit of 100,000,000,000 marks which Herr Rudolph Haverstein, President of the Reichsbank, thought was all that Germany could stand, and which he was sure would never be reached. If this figure be compared with the modest debt of \$1,250,000,000 which Germany owed before the war, some measure of the financial burden imposed upon the empire can be gained. And this figure does not take into account the debts of the separate states or of the communes, which are already large and steadily growing.

The total budget of the Imperial German Government in 1913-1914 was \$830,000,000; the interest on the existing debt is already \$900,000,000, and the next loan will bring it up to \$1,000,000,000 annually, or more than all the peace and military expenditures before the war. Existing taxes are insufficient to meet these demands, and interest is being paid out of new loans. Whether this situation will lead to repudiation or not, no man can now decide. But it is certain that the financial position of Germany, deprived of her expected indemnities, will be a desperate one after the war.

PRUSSIAN SUFFRAGE REFORM BEATEN IN DIET COMMITTEE.—Amsterdam, February 21.—The Franchise Committee of the lower house of the Prussian Diet has accepted by a vote of 20 to 15 the Conservatives' substitute proposal for a system of plural voting and representation based on professions and guilds, according to a Berlin telegram to-day.

Consequently the government's proposal, which provided for equal suffrage, was declared "disposed of."

GREAT BRITAIN

LLOYD GEORGE WEATHERS CRISIS.—At the close of February, the British Government was subjected to sharp opposition, centering in the resignation of General Robertson as Chief-of-Staff and the shift of Admiral Jellicoe

from the position of First Sea Lord. General Robertson's resignation was due to his disapproval of the powers given to the Versailles War Council.

A vote in Parliament on February 19, on a resolution expressing disapproval of the position taken by the Versailles Council toward German peace offers, sustained the Council and the British Ministry by 159 to 28. Referring to the powers of the Council, Mr. Lloyd George spoke as follows:

"The general principle laid down at Versailles was agreed to wholeheartedly by everybody. There was no conflict as regarded the policy, but only as to the method of giving effect to it. There was agreement as to the policy; there was agreement that there must be central authority to exercise supreme direction of that policy; there was agreement that authority must be inter-allied authority, and there was complete agreement that that authority should have executive power. The only question that arose was as to how that central authority should be constituted."

"The Premier asserted that the conclusions reached at Versailles were the result of very powerful representations by the delegates of other governments, notably the American Government.

"I hesitated for some time," said the Premier in referring to the American representations, "whether I should not read in the House of Commons the very cogent document submitted by the American delegation, which put the case for the present proposal. It is one of the ablest documents ever submitted to a military conference. The only reason why I do not read it to the House is that it is mixed with the plan of operations."

"The case is presented with irresistible power and logic," he added. "What happened? We altered the proposal here and there. There was a good deal of discussion, which took some hours. There was not a single dissentient voice, so far as the plan was concerned."

"The British commander, Field Marshal Sir Douglas Haig, was present at the session of the Supreme War Council, Mr. Lloyd George went on. He drew attention to two weak points in the proposal, which were thereupon adjusted by the conference. General Robertson was present when the decision was reported to the War Cabinet and did not object.

"It was agreed, said Mr. Lloyd George, that the permanent military adviser at Versailles should be a member of the Army Council. It was a part of this arrangement that the Chief of the Imperial Staff was to remain the supreme military adviser to the government.

"General Robertson, said the Premier, suggested a modification of the proposal by making the representative at Versailles a deputy of the Chief of Staff. The government felt bound to reject this suggestion, as it involved putting a subordinate in a position of the first magnitude, which might impose upon him the necessity of making vital decisions under instruction given him before the full facts were known.

"Being under the impression that all the difficulties had been overcome, continued the Premier, the government offered General Robertson a position on the Versailles Council, but he was unwilling to acquiesce in the system, objecting to it on military grounds. General Robertson, the Premier added, then refused the post of Chief of Staff with the powers which the Versailles conferences had decided to be proper to it.

"The country, said the Premier, was faced with terrible realities. He begged the House to have done with all controversy, adding that the government was entitled to know to-night whether the House and the country wished it to proceed with the policy deliberately arrived at.

"If the House of Commons repudiated the policy for which he was responsible, on which he believed the safety of the country depended, Mr. Lloyd George declared he would quit office. His one regret would be that he had not greater strength and ability to place at the disposal of his country in its gravest hour."—*N. Y. Times*, 20/2.

LABOR CONFERENCE BACKS ALLIED WAR AIMS.—The Inter-Allied Labor Conference, representing the Socialist or Labor parties of France, England, Italy, Belgium, Portugal, and South Africa, met in London during the week ending February 23. The war aims, practically endorsing those of the British Labor Conference on December 28, are stated as involving the establishment of a league of nations, with international cooperation for disarmament and the prevention of future warfare; the restoration of Belgium, Servia, Rumania, and Montenegro; the determination of future territorial changes to be based on justice and right, and the repudiation of economic boycotts after the war. Arthur Henderson, leader of the British Labor Party; Albert Thomas, the French delegate; and Emile Vandervelde, Socialist leader in the Belgian Chamber of Deputies, were the most influential leaders of the conference. It was voted to convene an immediate conference between the Socialists of the Allies and of Germany; to call an international Socialist conference to sit concurrently with the future official peace conference; and to demand that a Socialist representative be included by every nation in its official delegation to the peace conference. A delegation of five members, headed by Camille E. Huysmans, secretary of the international Socialist organization, is to be sent to the United States "for the purpose of conferring with the representatives of the American democracy on the war situation."—*N. Y. Nation*, 7/3.

JAPAN

JAPAN STILL REFRAINS FROM SIBERIAN ACTION.—Japan has not come to a decision regarding the dispatch of troops to Siberia, Premier Terauchi declared in replying to a question in the House of Representatives, according to a *Reuter* dispatch from Shanghai carrying Tokio advices under date of March 9.

The government, said the premier, would "take the utmost care and precaution in dealing with this momentous situation."

The agitation in favor of active measures against the German eastern menace continues. Professor Juretsu Shiga, of the Tokio Higher Technical School, affirms that the greatest crisis in the history of the country is approaching, and that this is no time for the 60,000,000 Japanese to go out looking for plums and cherry blossoms and taking life easy.

The *Japan Advertiser* says that Japan cannot stand off in splendid isolation while the rest of the world is in travail.

The *Yorozu Shimbun* says:

"When a fire starts in your neighbor's house can you still remain in bed?" It acknowledges that a more active participation in the war would lead to economical disadvantages, but says it is a bigger problem than mere economics, being a question of life and death. Though it might be economically disadvantageous, the paper asks, "which will be better to sacrifice, wealth and future advantage or to take measures to prevent permanent anxiety and possibly the utter ruin of the country?"—*Washington Evening Star*, 12/3.

JAPANESE INTERVENTION IN SIBERIA

NEGOTIATIONS WITH THE ALLIES.—On February 24, following the capitulation of Russia to Germany, Viscount Motono, Japanese Foreign Minister, stated that, if peace were ratified, "it goes without saying Japan will take steps of the most decided, most adequate character, to meet the occasion." Such action would have for its object protection of munitions and supplies shipped by the Allies to Russia and lying at Vladivostok and other points along the Trans-Siberian railway.

In accordance with this purpose, Japan during the last week in February directed informal inquiries to the Allied Powers. Press reports indicated that Great Britain and France were favorable to such action, but were of the opinion that difficulties would be avoided if Japan gave assurances of her intention to evacuate Russian territory when the emergency had passed.



JAPAN'S RELATION TO THE EUROPEAN CONFLICT.

From Literary Digest, March 16.

On March 5, Washington despatches stated that the United States Government, by means of informal conversations with the Japanese Foreign Office, had withheld consent to such a move, on the grounds that it was not clearly justified as an effective move against Germany, might further alienate Russia, and might be construed as inconsistent with the stated war aims of the Allies. The attitude of the United States was further indicated by President Wilson's friendly note of March 11 to the Russian Congress.

CHINA'S ATTITUDE.—China at a Cabinet Meeting on March 5 decided to despatch 20,000 troops with the Japanese expedition. Japanese and Chinese troops were already cooperating in control of that part of the Trans-Siberian railway traversing northern Manchuria—a move which gave control of the Siberian railway further east. China assumed control of the railway at Harbin on January 26.

BRITISH OPINION FAVORABLE TO INTERVENTION.—In a statement to the press on March 8, Lord Robert Cecil, Minister of Blockade, called attention to the possibilities opened up by Germany's peace compacts in the east, and strongly advocated Japanese occupation of Siberia. Speaking more guardedly in Parliament on March 14, Foreign Minister Balfour expressed perfect confidence in Japan's absolute loyalty in carrying out any decision that might be reached, and declared that in this question he had drawn no distinction between Japan and the other Allies.

MODERATE FEELING IN JAPAN.—Tokio, March 16.—Premier Terauchi and Foreign Minister Motono told Parliament to-day that nothing had been decided upon with reference to the Siberian situation.

Japan realizes, it is authoritatively stated, that if the United States declines its support, the situation will be extremely delicate because financial and material assistance must come from America. Any feeling of distrust

or unfriendliness seems to be lacking. A large section of influential men in Japan favor the American viewpoint, while only a few chauvinists jeer at Premier Terauchi and Foreign Minister Motono as being under American influence.

Leading men, such as Baron Shibusawa, President of the American-Japanese Association, for the commercial section, and Yukio Ozaki, leader of the Constitutional Party, for the "outs," advocate extreme caution. Similarly, many strong supporters of the administration point out that the hour for action has not yet struck.

They say that first it is absolutely necessary for all of Russia and the rest of the world to understand that Japan is engaged in no chauvinistic adventure, and desires nothing more than to safeguard the Far East, assist the Allies, and, if possible, save Russia from German domination, which means the mailed fist in the Far East.

The Chinese problem is one of the most serious features. It is recognized that this is China's great opportunity, and Japan is urging the leaders in the North and South to settle their differences by a sound compromise, form a capable national government at Peking, and join Japan and the Allies in guarding the frontiers and helping Russia. Some indications are manifest that this effort may be successful.—*N. Y. Times*, 17/3.

REVIEW OF BOOKS

ON

SUBJECTS OF PROFESSIONAL INTEREST

"Military Observation Balloons." By Widmer. (D. Van Nostrand Company, 1917.)

This book, based on the Balloon Manual of the German Army, contains a detailed description of the kite and spherical captive balloons in use by the German Army just prior to the European war.

As is well known, observation balloons are employed in great numbers by the contending armies, and their importance and usefulness are unquestioned. As stated by the publishers, keen students of the present war believe that the struggle will be won in the air. However, it is doubtful if observation balloons are entitled to be considered in this connection. The supremacy of the air depends on the strength and effectiveness of the airplane forces, and observation balloons cannot be used at all, where the opposing side has a marked superiority in this respect.

Probably there is little information contained in this volume, not already familiar to military aeronauts. The ground drill, maneuver, and ceremonies pertaining to balloon companies is treated in some detail, although there seems to be little necessity for such details, and they appear to be of no importance in connection with the use of balloons.

The inspection of balloon fabric, and the care and preservation of balloons, including precautions to be observed during storage, are treated with great care and attention to detail.

The chapter on the use of kite balloons in war, is, perhaps, the most interesting part of the text to military men. The author confesses serious difficulties in obtaining clear observations from balloons, and in distinguishing troops, except during movement, from natural features of the terrain. No reference is made with regard to protection against the attack of airplanes, or to the use of the parachute or other safety precautions for the observers.

The book furnishes a good illustration of the care and thoroughness employed by the German Army in every detail of their military preparations.

W. P. U.

"The Marvel Book of American Ships." By Captain Orton P. Jackson, U. S. Navy, and Major Frank E. Evans, U. S. M. C. 391 pages and 436 illustrations; 12 plates in full color. (Frederick A. Stokes Company, 1917.)

A very interesting, non-technical and comprehensive book, describing fully all phases of the building of ships from the laying of the keel to the completed ship, whether it be man-of-war, merchantman or pleasure craft.

The history and description of all classes of ships is interestingly written

and well illustrated, as are also the chapters descriptive of the making of the man-o'-war's man and officer.

The accounts of the life on board ship, in camps, target practice, travels, pleasures and tragedies of the sea, the seven great sea battles, and numerous other subjects which pertain to the sea, hold the reader's attention throughout.

The book also contains two charts showing the house flags and markings of funnels of the principal steamship lines of the world, also one showing the international code flags and pennants, ensigns and national merchant marine flags of the principal maritime nations.

Summary: Comprehensive description of the classes of ships, ship life, countless other subjects pertaining to the sea; illustrations are excellent; reading interesting as well as instructive and time well spent.

G. C. P.

NOTICE

The U. S. Naval Institute was established in 1873, having for its object the advancement of professional and scientific knowledge in the Navy. It is now in its forty-fifth year of existence, trusting as heretofore for its support to the officers and friends of the Navy. The members of the Board of Control cordially invite the co-operation and aid of their brother officers and others interested in the Navy, in furtherance of the aims of the Institute, by the contribution of papers and communications upon subjects of interest to the naval profession, as well as by personal support and influence.

On the subject of membership the Constitution reads as follows:

ARTICLE VII

Sec. 1. The Institute shall consist of regular, life, honorary and associate members.

Sec. 2. Officers of the Navy, Marine Corps, and all civil officers attached to the Naval Service, shall be entitled to become regular or life members, without ballot, on payment of dues or fees to the Secretary and Treasurer. Members who resign from the Navy subsequent to joining the Institute will be regarded as belonging to the class described in this Section.

Sec. 3. The Prize Essayist of each year shall be a life member without payment of fee.

Sec. 4. Honorary members shall be selected from distinguished Naval and Military Officers, and from eminent men of learning in civil life. The Secretary of the Navy shall be, *ex officio*, an honorary member. Their number shall not exceed thirty (30). Nominations for honorary members must be favorably reported by the Board of Control. To be declared elected, they must receive the affirmative vote of three-quarters of the members represented at regular or stated meetings, either in person or by proxy.

Sec. 5. Associate members shall be elected from Officers of the Army, Revenue Cutter Service, foreign officers of the Naval and Military professions, and from persons in civil life who may be interested in the purposes of the Institute.

Sec. 6. Those entitled to become associate members may be elected life members, provided that the number not officially connected with the Navy and Marine Corps shall not at any time exceed one hundred (100).

Sec. 7. Associate members and life members, other than those entitled to regular membership, shall be elected as follows: "Nominations shall be made in writing to the Secretary and Treasurer, with the name of the member making them, and such nominations shall be submitted to the Board of Control. The Board of Control will at each regular meeting ballot on the nominations submitted for election, and nominees receiving a majority of the votes of the board membership shall be considered elected to membership in the United States Naval Institute."

Sec. 8. The annual dues for regular and associate members shall be two dollars and fifty cents, all of which shall be for a year's subscription to the UNITED STATES NAVAL INSTITUTE PROCEEDINGS, payable upon joining the Institute, and upon the first day of each succeeding January. The fee for life membership shall be forty dollars, but if any regular or associate member has paid his dues for the year in which he wishes to be transferred to life membership, or has paid his dues for any future year or years, the amount so paid shall be deducted from the fee for life membership.

ARTICLE X

Sec. 2. One copy of the PROCEEDINGS, when published, shall be furnished to each regular and associate member (in return for dues paid), to each life member (in return for life membership fee paid), to honorary members, to each corresponding society of the Institute, and to such libraries and periodicals as may be determined upon by the Board of Control.

The PROCEEDINGS are published monthly; subscription for non-members, \$3.00; enlisted men, U. S. Navy, \$2.50. Single copies, by purchase, 30 cents; issues preceding January, 1918, 50 cents.

All letters should be addressed U. S. Naval Institute, Annapolis, Md., and all checks, drafts, and money orders should be made payable to the same.

SPECIAL NOTICE

NAVAL INSTITUTE PRIZE ESSAY, 1919

A prize of two hundred dollars, with a gold medal, and a life-membership (unless the author is already a life member) in the Institute, is offered by the Naval Institute for the best essay on any subject pertaining to the naval profession published in the PROCEEDINGS during the current year. The prize will be in addition to the author's compensation paid upon publication of the essay.

On the opposite page are given suggested topics. Essays are not limited to these topics and no additional weight will be given an essay in awarding the prize because it is written on one of these suggested topics over one written on any subject pertaining to the naval profession.

The following rules will govern this competition:

1. All essays published in the PROCEEDINGS during 1918, which are deemed by the Board of Control to be of sufficient merit, will be passed upon by the Board during the month of January, 1919, and the award for the prize will be made by the Board of Control, voting by ballot.

2. No essay received after November 1 will be available for publication in 1918. Essays received subsequent to November 1, if accepted, will be published as soon as practicable thereafter.

3. If, in the opinion of the Board of Control, the best essay published during 1918 is not of sufficient merit to be awarded the prize, it may receive "Honorable Mention," or such other distinction as the Board may decide.

4. In case one or more essays receive "Honorable Mention," the writers thereof will receive a minimum prize of seventy-five dollars and a life-membership (unless the author is already a life member) in the Institute, the actual amounts of the awards to be decided by the Board of Control in each case.

5. Essays are limited to fifty (50) printed pages in the PROCEEDINGS of the Institute.

6. It is requested that all essays be submitted typewritten and in duplicate; essays submitted written in longhand and in single copy will, however, receive equal consideration.

7. In the event of the prize being awarded to the winner of a previous year, a gold clasp, suitably engraved, will be given in lieu of the gold medal.

By direction of the Board of Control.

G. M. RAVENSCROFT,

Lieut. Commander, U. S. N., Secretary and Treasurer.

PRIZE ESSAY TOPICS

SUGGESTED AT THE INVITATION OF THE BOARD OF CONTROL

BY

THE PRESIDENT OF THE NAVAL INSTITUTE, THE SUPERINTENDENT
OF THE NAVAL ACADEMY, THE PRESIDENT OF THE NAVAL WAR
COLLEGE, AND THE COMMANDERS-IN-CHIEF OF THE ATLANTIC,
PACIFIC AND ASIATIC FLEETS.

“The Place of the Naval Officer in International Affairs.”

“The Evolution of Naval Doctrine from National Character.”

“The Training of Enlisted Personnel to Produce Modern Man-o’-
Warsmen: (a) Military Training; (b) Moral Training;
(c) Education.”

“The Organization, Employment and Training of Reserve Fleets
and Flotillas.”

LIST OF PRIZE ESSAYS

"WHAT THE NAVY HAS BEEN THINKING ABOUT"

1879

Naval Education. Prize Essay, 1879. By Lieut. Commander A. D. Brown, U. S. N.

NAVAL EDUCATION. First Honorable Mention. By Lieut. Commander C. F. Goodrich, U. S. N.

NAVAL EDUCATION. Second Honorable Mention. By Commander A. T. Mahan, U. S. N.

1880

"The Naval Policy of the United States." Prize Essay, 1880. By Lieutenant Charles Belknap, U. S. N.

1881

The Type of (I) Armored Vessel, (II) Cruiser Best Suited to the Present Needs of the United States. Prize Essay, 1881. By Lieutenant E. W. Very, U. S. N.

SECOND PRIZE ESSAY, 1881. By Lieutenant Seaton Schroeder, U. S. N.

1882

Our Merchant Marine: The Causes of Its Decline and the Means to Be Taken for Its Revival. "Nil clarius aquis." Prize Essay, 1882. By Lieutenant J. D. Kelley, U. S. N.

"MAIS IL FAUT CULTIVER NOTRE JARDIN." Honorable Mention. By Master C. G. Calkins, U. S. N.

"SPERO MELIORA." Honorable Mention. By Lieut. Commander F. E. Chadwick, U. S. N.

"CAUSA LATET: VIS EST NOTISSIMA." Honorable Mention. By Lieutenant R. Wainwright, U. S. N.

1883

How May the Sphere of Usefulness of Naval Officers Be Extended in Time of Peace with Advantage to the Country and the Naval Service? "Pour encourager les Autres." Prize Essay, 1883. By Lieutenant Carlos G. Calkins, U. S. N.

"SEMPER PARATUS." First Honorable Mention. By Commander N. H. Farquhar, U. S. N.

"CULIBET IN ARTE SUA CREDENDUM EST." Second Honorable Mention. By Captain A. P. Cooke, U. S. N.

1884

The Reconstruction and Increase of the Navy. Prize Essay, 1884. By Ensign W. I. Chambers, U. S. N.

1885

Inducements for Retaining Trained Seamen in the Navy, and Best System of Rewards for Long and Faithful Service. Prize Essay, 1885. By Commander N. H. Farquhar, U. S. N.

1886

What Changes in Organization and Drill Are Necessary to Sail and Fight Effectively Our Warships of Latest Type? "Scire quod nescias." Prize Essay, 1886. By Lieutenant Carlos G. Calkins, U. S. N.

THE RESULT OF ALL NAVAL ADMINISTRATION AND EFFORTS FINDS ITS EXPRESSION IN GOOD ORGANIZATION AND THOROUGH DRILL ON BOARD OF SUITABLE SHIPS. Honorable Mention. By Ensign W. L. Rodgers, U. S. N.

1887

The Naval Brigade: Its Organization, Equipment and Tactics. "In hoc signo vinces." Prize Essay, 1887. By Lieutenant C. T. Hutchins.

1888

Torpedoes. Prize Essay, 1888. By Lieut. Commander W. W. Reisinger, U. S. N.

1891

The Enlistment, Training and Organization of Crews for Our Ships of War. Prize Essay, 1891. By Ensign A. P. Niblack, U. S. N.

DISPOSITION AND EMPLOYMENT OF THE FLEET: SHIP AND SQUADRON DRILL. Honorable Mention, 1891. By Lieutenant R. C. Smith, U. S. N.

1892

Torpedo-boats: Their Organization and Conduct. Prize Essay, 1892. By Wm. Laird Clowes.

1894

The U. S. S. Vesuvius, with Special Reference to Her Pneumatic Battery. Prize Essay, 1894. By Lieut. Commander Seaton Schroeder, U. S. N.

NAVAL REFORM. Honorable Mention, 1894. By Passed Assistant Engineer F. M. Bennett, U. S. N.

1895

Tactical Problems in Naval Warfare. Prize Essay, 1895. By Lieut. Commander Richard Wainwright, U. S. N.

A SUMMARY OF THE SITUATION AND OUTLOOK IN EUROPE. An Introduction to the Study of Coming War. Honorable Mention, 1895. By Richmond Pearson Hobson, Assistant Naval Constructor, U. S. N.

SUGGESTIONS FOR INCREASING THE EFFICIENCY OF OUR NEW SHIPS. Honorable Mention, 1895. By Naval Constructor Wm. J. Baxter, U. S. N.

THE BATTLE OF THE YALU. Honorable Mention, 1895. By Ensign Frank Marble, U. S. N.

1896

The Tactics of Ships in the Line of Battle. Prize Essay, 1896. By Lieutenant A. P. Niblack, U. S. N.

THE ORGANIZATION, TRAINING AND DISCIPLINE OF THE NAVY PERSONNEL AS VIEWED FROM THE SHIP. Honorable Mention, 1896. By Lieutenant Wm. F. Fullam, U. S. N.

NAVAL APPRENTICES, INDUCEMENTS, ENLISTING AND TRAINING. The Seaman Branch of the Navy. Honorable Mention, 1896. By Ensign Ryland D. Tisdale, U. S. N.

THE COMPOSITION OF THE FLEET. Honorable Mention 1896. By Lieutenant John M. Ellicott, U. S. N.

1897

Torpedo-boat Policy. Prize Essay, 1897. By Lieutenant R. C. Smith, U. S. N.

A PROPOSED UNIFORM COURSE OF INSTRUCTION FOR THE NAVAL MILITIA. Honorable Mention, 1897. By H. G. Dohrman, Associate Member, U. S. N. I.

TORPEDOES IN EXERCISE AND BATTLE. Honorable Mention, 1897. By Lieutenant I. M. Ellicott, U. S. N.

1898

- Esprit de Corps: A Tract for the Times.** Prize Essay, 1898. By Captain Caspar Frederick Goodrich, U. S. N.
OUR NAVAL POWER. Honorable Mention, 1898. By Lieut. Commander Richard Wainwright, U. S. N.
TARGET PRACTICE AND THE TRAINING OF GUN CAPTAINS. Honorable Mention, 1898. By Ensign R. H. Jackson, U. S. N.

1900

- Torpedo Craft: Types and Employment.** Prize Essay, 1900. By Lieutenant R. H. Jackson, U. S. N.
THE AUTOMOBILE TORPEDO AND ITS USES. Honorable Mention, 1900. By Lieutenant L. H. Chandler, U. S. N.

1901

- Naval Administration and Organization.** Prize Essay, 1901. By Lieutenant John Hood, U. S. N.

1903

- Gunnery in Our Navy.** The Causes of Its Inferiority and Their Remedies. Prize Essay, 1903. By Professor Philip R. Alger, U. S. N.
A NAVAL TRAINING POLICY AND SYSTEM. Honorable Mention, 1903. By Lieutenant James H. Reid, U. S. N.
SYSTEMATIC TRAINING OF THE ENLISTED PERSONNEL OF THE NAVY. Honorable Mention, 1903. By Lieutenant C. L. Hussey, U. S. N.
OUR TORPEDO-BOAT FLOTILLA. The Training Needed to Insure Its Efficiency. Honorable Mention, 1903. By Lieutenant E. L. Beach, U. S. N.

1904

- The Fleet and Its Personnel.** Prize Essay, 1904. By Lieutenant S. P. Fullinwider, U. S. N.
A PLEA FOR A HIGHER PHYSICAL, MORAL AND INTELLECTUAL STANDARD OF THE PERSONNEL FOR THE NAVY. Honorable Mention, 1904. By Medical Inspector Howard E. Ames, U. S. N.

1905

- American Naval Policy.** Prize Essay, 1905. By Commander Bradley A. Fiske, U. S. N.
THE DEPARTMENT OF THE NAVY. Honorable Mention, 1905. By Rear Admiral Stephen B. Luce, U. S. N.

1906

- Promotion by Selection.** Prize Essay, 1906. By Commander Hawley O. Rittenhouse, U. S. N.
THE ELEMENTS OF FLEET TACTICS. First Honorable Mention, 1906. By Lieut. Commander A. P. Niblack, U. S. N.
GLEANINGS FROM THE SEA OF JAPAN. Second Honorable Mention, 1906. By Captain Seaton Schroeder, U. S. N.
THE PURCHASE SYSTEM OF THE NAVY. Third Honorable Mention, 1906. By Pay Inspector J. A. Mudd, U. S. N.

1907

- Storekeeping at the Navy Yards.** Prize Essay, 1907. By Pay Inspector John A. Mudd, U. S. N.
- BATTLE REHEARSALS.** A Few Thoughts on Our Next Step in Fleet-Gunnery. First Honorable Mention, 1907. By Lieut. Commander Yates Stirling, U. S. N.
- THE NAVAL PROFESSION.** Second Honorable Mention, 1907. By Commander Bradley A. Fiske, U. S. N.

1908

- A Few Hints to the Study of Naval Tactics.** Prize Essay, 1908. By Lieutenant W. S. Pye, U. S. N.
- THE MONEY FOR THE NAVY.** First Honorable Mention, 1908. By Pay Inspector John A. Mudd, U. S. N.
- THE NATION'S DEFENCE—THE OFFENSIVE FLEET.** How Shall We Prepare It for Battle? Second Honorable Mention, 1908. By Lieut. Commander Yates Stirling, U. S. N.

1909

- Some Ideas about Organization on Board Ship.** Prize Essay, 1909. By Lieutenant Ernest J. King, U. S. N.
- THE NAVY AND COAST DEFENCE.** Honorable Mention, 1909. By Commodore W. H. Beehler, U. S. N.
- THE REORGANIZATION OF THE NAVAL ESTABLISHMENT.** Honorable Mention, 1909. By Pay Inspector J. A. Mudd, U. S. N.
- A PLEA FOR PHYSICAL TRAINING IN THE NAVY.** Honorable Mention, 1909. By Commander A. P. Niblack, U. S. N.

1910

- The Merchant Marine and the Navy.** Prize Essay, 1910. By Naval Constructor T. G. Roberts, U. S. N.
- THE NAVAL STRATEGY OF THE RUSSO-JAPANESE WAR.** Honorable Mention, 1910. By Lieutenant Lyman A. Cotton, U. S. N.

1911

- Navy Yard Economy.** Prize Essay, 1911. By Paymaster Charles Conard, U. S. N.
- NAVAL POWER.** Honorable Mention, 1911. By Captain Bradley A. Fiske, U. S. N.
- WANTED—FIRST AID.** Honorable Mention, 1911. By Commander C. C. Marsh, U. S. N.

1912

- Naval Might.** Prize Essay, 1912. By Lieutenant Ridgely Hunt, U. S. N. (retired).
- INSPECTION DUTY AT THE NAVY YARDS.** Honorable Mention, 1912. By Lieut. Commander T. D. Parker, U. S. N.

1913

- The Greatest Need of the Atlantic Fleet.** Prize Essay, 1913. By Lieut. Commander Harry E. Yarnell, U. S. N.
- NAVY DEPARTMENT ORGANIZATION.** A Study of Principles. First Honorable Mention, 1913. By Commander Yates Stirling, Jr., U. S. N.
- TRAINED INITIATIVE AND UNITY OF ACTION.** Second Honorable Mention, 1913. By Lieut. Commander Dudley W. Knox, U. S. N.

1914

- The Great Lesson from Nelson for To-day.** Prize Essay, 1914. By Lieut. Commander Dudley W. Knox, U. S. N.
- NAVAL POLICY AS IT RELATES TO THE SHORE ESTABLISHMENT AND THE MAINTENANCE OF THE FLEET.** Honorable Mention, 1914. By Captain John Hood, U. S. N.
- OLD PRINCIPLES AND MODERN APPLICATIONS.** Honorable Mention, 1914. By Lieut. Commander Dudley W. Knox, U. S. N.
- MILITARY PREPAREDNESS.** Honorable Mention, 1914. By Naval Constructor Richard D. Gatewood, U. S. N.

1915

- The Rôle of Doctrine in Naval Warfare.** Prize Essay, 1915. By Lieut. Commander Dudley W. Knox, U. S. N.
- AN AIR FLEET: OUR PRESSING NAVAL WANT.** First Honorable Mention, 1915. By Lieut. Commander Thomas Drayton Parker, U. S. N.
- TACTICS.** Second Honorable Mention, 1915. By Ensign H. H. Frost, U. S. N.
- DEFENCE AGAINST SURPRISE TORPEDO ATTACK.** Third Honorable Mention, 1915. By Ensign R. T. Merrill, 2d, U. S. N.

1916

- The Moral Factor in War.** Prize Essay, 1916. By Lieutenant (J. G.) H. H. Frost, U. S. N.
- NAVAL PERSONNEL.** First Honorable Mention, 1916. By Lieut. Commander J. K. Taussig, U. S. N.
- EDUCATION AT THE U. S. NAVAL ACADEMY.** Second Honorable Mention, 1916. By Lieutenant Ridgely Hunt, U. S. N.
- SOME UNDERLYING PRINCIPLES OF MORALE.** Third Honorable Mention, 1916. By Commander Dudley W. Knox, U. S. N.
- LARGE vs. A GREATER NUMBER OF SMALLER BATTLESHIPS.** Lippincott Prize Essay. By Lieut. Commander Thomas Lee Johnson, U. S. N.

1917

- Commerce Destroying in War.** Prize Essay, 1917. By Commander Lyman A. Cotten, U. S. Navy.
- THE PEOPLE'S RÔLE IN WAR.** First Honorable Mention, 1917. By Lieutenant H. H. Frost, U. S. Navy.
- THE NATION'S GREATEST NEED.** Second Honorable Mention, 1917. By Colonel Dion Williams, U. S. Marine Corps.

1918

- Letters on Naval Tactics.** Prize Essay, 1918. By Lieutenant H. H. Frost, U. S. N.
- THE PREPAREDNESS OF THE FUTURE.** First Honorable mention, 1918. By Commander H. O. Rittenhouse, U. S. N. Retired.
- NAVAL STRATEGY.** Second Honorable Mention, 1918. By Rear Admiral Bradley A. Fiske, U. S. N.

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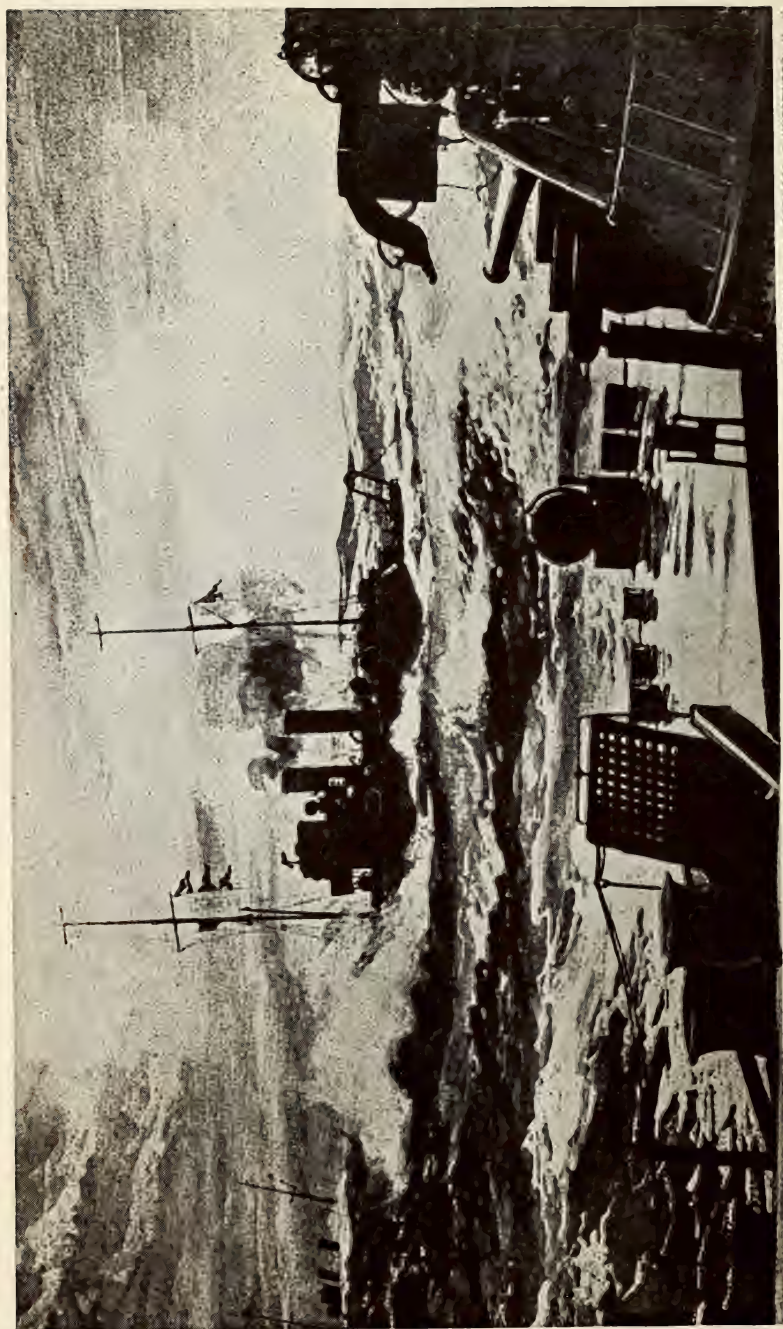
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REAR ADMIRAL RICHARD WAINWRIGHT, U. S. NAVY, OCT. 1909-OCT.
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ON CONSTANT GUARD AGAINST U-BOATS AND DESTROYERS IN THE NORTH SEA.

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THE RIGHT OF VISIT AND SEARCH

By CAPTAIN WILLIAM C. WATTS, U. S. Navy

DEFINITION

In general terms, the Right of Visit and Search, in its commonly accepted meaning, may be defined as that right accorded to lawfully commissioned public vessels of war of belligerent nations to overhaul outside of neutral waters private neutral vessels for the purpose of visiting, and if necessary searching, them in order to determine their character and nature of service.

More specifically, the object of visit and search is to determine:

- (1) The vessel's nationality,
- (2) Whether there is contraband on board, either absolute or conditional,
- (3) Whether breach of blockade is intended or has been committed,
- (4) Whether engaged in unneutral service, either direct or indirect,
- (5) The ports of departure and destination.

It however may be exercised for any purpose that can be shown to be necessary to the belligerent power concerned, either for its protection or for the prevention of acts advantageous to the belligerent activities of its enemy.

HISTORICAL

In the earliest wars of which there is authentic record, belligerents recognized the right to destroy all public and private enemy property that they were able to seize, and frequently even went so far as to treat neutral ships carrying enemy goods as enemy vessels. Even in those days when neutral rights were so lightly regarded, it must have been necessary to resort to the right of visit and search in some form to determine the presence of enemy goods on neutral vessels before their destruction.

Gradually, however, the trend of custom was in the direction of greater liberality to neutrals, and a clearer distinction between their vessels and property and those of the belligerents. This was first formally recognized in the *Consolato del Mare*, one of the most important and best preserved of the early codes of usages and customs. This code, compiled at Barcelona, Spain, in the middle or latter part of the fourteenth century and comprising the maritime usages of the communities of the Mediterranean, was the first also to mention the right of visit and search, and undoubtedly ever since that time it has been recognized, although details of its exercise have been the subject of much protest and disagreement throughout all the succeeding years, up to and even including the present.

The *raison d'être* of the right of visit and search is most obvious in principle, and perhaps never has been set forth more forcibly in official records than by Sir William Scott (afterward Lord Stowell) who, in the case of the *Maria* in 1799 (1 C. Robinson's Admiralty Reports, 340) says:

I state a few principles of that system of law which I take to be incontrovertible.

1. That the right of visiting and searching merchants ships upon the high seas, whatever be the ships, whatever be the cargoes, whatever be the destinations, is an incontestable right of the lawfully commissioned cruisers of a belligerent nation. I say, be the ships, the cargoes, and the destinations what they may, because till they are visited and searched it does not appear what the ships, or the cargoes, or the destinations are, and it is for the purpose of ascertaining these points that the necessity of this right of visitation and search exists. This right is so clear in principle that no man can deny it who admits the legality of maritime capture, because if you are not at liberty to ascertain by sufficient inquiry whether there is property that can be legally captured it is impossible to capture.

DEVELOPMENTS FROM EARLY CONCEPTIONS

In the earlier days, Great Britain asserted the right to extend visitation to neutral men-of-war, and tried to exercise this right, in part successfully and in part unsuccessfully, but during the nineteenth century it became universally recognized that neutral men-of-war are not objects of the right of visit and search of belligerents.

Also it required time to settle definitely what vessels may exercise the right of visit and search. When privateering formed such an important element of the sea warfare of some states, little restriction could be exercised as to the responsibility of those exercising the right, and neutral commerce suffered great and unnecessary inconvenience and loss through arbitrary acts. Nevertheless the right of privateers to visit and search was generally maintained. But since even such states as have not acceded to the Declaration of Paris, by which privateering was abolished, do not in practice issue Letters of Marque at the present time, it is probable that this question will not again be presented.

Oppenheim states (Vol. 2, page 534) that "since an armistice does not bring war to an end, and since, on the other hand, the exercise of the right of visitation is not an act of warfare, this right may be exercised during the time of a partial as well as of a general armistice." This dictum represents the consensus of opinion and practice on this question, but it is not universally recognized and has been the subject of some uncertainty. As a possible corollary to this holding, it might also be said in strict law that the right of visit and search might be exercised after the conclusion of peace, but before the treaty of peace is ratified. This seems to be carrying the principle unduly far, and the "*Règlement international des prises maritimes*" of the Institute of International Law declares the right of visit and search to cease "*avec les préliminaires de la paix*." This code also disagrees with the foregoing views of Oppenheim as to visit and search during an armistice.

Various efforts have been made in treaties and otherwise to prescribe definitely the distance to which a man-of-war may approach a merchantman for the purpose of exercising the right of visit and search. These were undoubtedly induced by a desire to protect the safety of the neutral ship from unlawful damage from pirates posing as belligerent men-of-war, and it was variously

suggested that the visiting vessel should not approach within "cannon shot," or within half such distance. But all of these propositions were advanced by those not familiar with sea conditions, and with the impracticability of using small boats over great distances, especially in bad weather, so that nothing materialized from these efforts. Likewise, it was urged at one time that the merchantman should be required to send its papers to the visiting vessel, but as generally the man-of-war would have a more complete outfit of boats it was decided that the duty of communication lay on the latter.

At times, there has also been a tendency to limit the area in which visit and search may be exercised, it being claimed that its extension to all parts of the world imposes unnecessary hardships on neutrals. One proposition contemplated limiting the exercise of the right to the area within a radius of one hundred miles from belligerent ports. But in this, as in all other plans, it was evident that a different effect on various neutrals would be produced, depending on their geographical location; and, largely because such distinction is so contrary to the principles of equal rights in international law, none of the restricting proposals has been adopted. Great Britain, in 1900, during the Boer War voluntarily discontinued searching vessels in the Red Sea, but this was quite as much to save annoyance to herself as in deference to neutral interests. The U. S. Naval War College reached the following conclusion as to limitation of area in which visit and search should be exercised (Topics and Discussions, 1905):

The area of the exercise of the right of visit and search should not be limited, but greater restrictions may justly be demanded against its exercise in an arbitrary and burdensome manner.

In connection with the subject of the area of applicability, it may be noted that the practice has grown up of recognizing the right of belligerents to carry on visit and search within the maritime belts of their allies who are also belligerent, but only with their consent, this in addition of course to the general right on the high seas, within their own territorial waters, and within those of their enemy or enemies. However, the exercise of this right within the maritime belt of a neutral is an offence against the neutrality of that state which would not be condoned.

In every respect other than in restricting the area in which the right of visit and search may be exercised, the general develop-

ment of international law affecting this question has been in an effort to produce thereby as little inconvenience, interference and damage to neutral interests as possible. Consequently it became recognized in general terms that the right must be exercised with tact and consideration, and in strict conformity with treaty provisions where they exist; that the visit and search must be conducted in such manner as to attain its object and nothing more; that any unnecessary injury to the merchant ship or its cargo, or any oppressive or insulting conduct toward its officers or crew may be good ground for suit in the courts to which the man-of-war is amenable; that mail ships, although they can be visited in case of necessity, should not be held up, detained or diverted from their course more than absolutely necessary; and finally that no ship should be diverted unduly from its course merely on suspicion, although this latter point is one that has been the subject of much dispute during the present war, as mentioned later.

Thus we find in the British Naval Prize Act of 1864, Chapter II, various regulations for the guidance of British naval officers in the exercise of their powers of visit and search. Pertinent among them, as indicating the drift of opinion, is the following:

If a commander in the exercise of these powers detain a vessel without probable cause, or do an act not sanctioned by international law or otherwise unwarrantable, he will incur the displeasure of Her Majesty's government, and will also be personally liable for damages.

The commander is likewise responsible in damages for the acts of all under his command, whether he himself is present or absent; . . .

Likewise, at a later date, the Japanese regulations relating to capture at sea, of 7 March, 1904, make specific provisions for the protection of neutrals, significant paragraphs being as follows:

Art. 61. In visiting or searching a vessel, the captain of the man-of-war shall take care not to divert her from her original course more than necessary, and as far as possible not to give her inconvenience.

Art. 62. The boarding officer, before he leaves the vessel, shall ask the master whether he has any complaint regarding the procedure of visiting or searching or any other points; and if the master makes any complaints he shall request him to produce them in writing.

Article XVIII of the treaty between the United States and Italy of 26 February, 1871, contains definite provisions tending to reduce the annoyance and interference caused to merchant vessels of the one when neutral, by the visit and search of men-of-war of the other, when a belligerent. The United States also has treaties with

the following other powers in which the exercise of visit and search is affected: Bolivia, 1858; Colombia (New Granada), 1846; Prussia, 1799; Sweden (and Norway), 1783.

As previously stated, it became generally conceded that neutral vessels carrying mail shall be interfered with as little as possible. The Proclamation of the President of the United States at the time of the War with Spain, dated 26 April, 1898, includes the following, as indicating the attitude of this country on this subject at that time:

The right of search is to be exercised with strict regard for the rights of neutrals, and the voyages of mail steamers are not to be interfered with except on the clearest grounds of suspicion of a violation of law in respect of contraband or blockade.

Nevertheless, some uncertainty has always existed as to the further right, in case a mail ship is visited, to search the mails when contained in sacks sealed in accordance with the regulations of the neutral State under whose flag the vessel sails. A certificate from a duly authorized postal agent that the sacks contain no unneutral matter, or correspondence intended for the military advantage of the enemy, is often accepted as authorizing the mail to be forwarded unopened. In the Civil War, this led to a lengthy consideration of the case, involving the question of whether mails on captured blockade runners might be sent to the prize court to be opened, in which the Secretary of State and the Secretary of the Navy disagreed (Moore's Digest, Vol. 7, p. 480 *et seq.*). The conclusion was reached that such public mails "would not be opened, but would be forwarded to their destination." The question is not free from doubt, however, in its various phases, as is indicated by the differences of opinion on the subject in the present war.

More differences of opinion in the past centuries have arisen over the effect of Convoy, both neutral and belligerent, on the right of visit and search than over any other phase of the subject, and the development of recognized standards in these matters will now be considered.

NEUTRAL CONVOY

In 1653, during a war between Great Britain and the Netherlands, Sweden claimed that the belligerents should waive their right of visitation over Swedish merchantmen, if the latter sailed under the

convoy of a Swedish man-of-war whose commander asserted the absence of contraband on board the convoyed vessels. Queen Christina of Sweden accordingly directed Swedish men-of-war to act as convoys when needed and "in all possible ways to decline that they or any of those that belong to them be searched." The Peace of Westminster, occurring soon afterwards, by putting an end to the existing war, prevented any immediate occasion of dispute, but the question kept arising repeatedly from various sources thereafter. In the same year, some Dutch merchant vessels under convoy of a man-of-war were searched by the British; the States-General admitted that "no reasonable complaints could be made," although they "were persuaded that such visitation and search tended to an inconveniency of trade." Two years later the Dutch Admiral De Ruyter, while escorting a convoy of ships, successfully resisted an attempt to visit made by the Commodore of a British squadron. The result was a compromise arrangement between the two states, and no further discussion arose until 1756 when the Dutch being neutral again claimed the right of convoy. Gradually the doctrine gained ground among Continental neutrals, Great Britain opposing, but it was not until the end of the eighteenth century that it was so seriously pressed as to demand attention. The American War of Independence raised numerous instances for discussion, and between 1780 and 1800 treaties were concluded in which Russia, Austria, Prussia, Denmark, Sweden, France, the United States, and other states recognized the right of convoy. Great Britain continuing to refuse to acknowledge that right, and in July, 1800, having captured a Danish man-of-war and her convoy of six merchantmen for resistance to visitation, the Baltic powers entered into the treaty of Armed Neutrality of 1800. "Yet Great Britain still resisted, and by Article 4 of the 'Maritime Convention' of St. Petersburg of June 17, 1801, she conceded to Russia only that vessels under convoy should not be visited by privateers. During the nineteenth century more and more treaties stipulating the right of convoy were concluded, but this right was not mentioned in the Declaration of Paris of 1856, and Great Britain refused to recognize it throughout the century." (Oppenheim, Vol. II, p. 536.) The Declaration of Paris having enunciated the doctrine that the neutral flag covers enemy goods other than contraband, the British found less necessity of insisting on their claimed right to visit and search vessels under

escort. Moreover in the Crimean War they waived this right, in order to secure harmonious cooperation with the French, who recognized the right of convoy. So it may be said that the British opposition to the otherwise general acceptance of that right was weakening. William Edward Hall, an eminent British authority on International Law, writing in the latter part of the nineteenth century, sets forth what may fairly be considered the British views on the subject, asserting that the Continental contention of the right of convoy as an established rule of law is inadmissible; and that the exercise of this right is unfair to belligerents in placing too much temptation in the way of unscrupulous or careless neutrals to benefit their trade at the expense of the belligerent. In the fourth edition of his treatise on International Law, published in 1895, the following conclusion is expressed:

It cannot but be concluded that the principle of the exemption of convoyed ships from visit is not embraced in authoritative international law, and that while its adoption into it would probably be injurious to belligerents, it is not likely to be permanently to the advantage of neutrals.

Nevertheless, Great Britain abandoned her opposition to the right of convoy at the Naval Conference of London of 1908-1909, and the matter is settled satisfactorily by Articles 61 and 62 of the Declaration of London, which is recognized as expressing the unanimous opinion of the powers, although all are not yet signatory to it. By these articles, it is provided that neutral merchant vessels under the convoy of a man-of-war flying the same flag are exempt from search and may not be visited, if the commander of the convoy, on request of the belligerent man-of-war, gives in writing all information as to the character of the vessels of the convoy and their cargoes which could be obtained by search. Should the commander of the belligerent man-of-war suspect any irregularities, he must communicate with the convoy commander who in turn must investigate, and in case the facts thus disclosed justify the capture of one or more of the vessels of the convoy, he must withdraw protection from the offenders who may then be captured by the belligerent man-of-war. In case a difference of opinion arises between the two commanders, the decision of the commander of the convoy must govern as between them, and the other commander may only protest and report the case to his government, to be settled through diplomatic channels.

BELLIGERENT CONVOY

When the acts of belligerents toward neutral private vessels were not always marked with that care and sense of rectitude that later developed, it was frequently advisable, and indeed almost necessary in some instances, for neutral merchantmen to apply for protection in the convoys of one of the belligerents. Whereas this protection was frequently granted and accepted, it seems to have been accompanied by the recognized risk of condemnation in case of capture, for the mere association with the belligerent convoy constituted an unneutral act.

Wheaton alone seems to take the stand that such an act of itself is insufficient to justify condemnation, though the detention and investigation of such a vessel is warranted, and if other incriminating circumstances then appear against her, a decree of condemnation might of course be pronounced.

Other authorities of both England and the United States generally agree, however, as was maintained by the English courts also, "that the acceptance by a neutral vessel of the convoy of a belligerent man-of-war is an illegal act, and in itself affords good ground for condemnation, if the vessel, while under such convoy, be captured by the other belligerent." (Moore's Digest, Vol. 7, p. 495.) It is noteworthy however that on one occasion the United States took a somewhat different stand in this matter, when indemnities were claimed against Denmark for the condemnation in Danish Prize Courts in 1810 of certain American vessels that had been captured without making any resistance whatever while in company with a belligerent British convoy. In this controversy the United States was represented by Mr. Wheaton, who has been mentioned as holding the minority view. His arguments were based largely on the contentions that a neutral vessel is not robbed of her neutrality by joining a belligerent convoy provided she makes no resistance, and that no right of the belligerent is thus injured, unless possibly that of visit and search which, besides not being a substantive and independent right, had never in the cases under discussion been opposed in fact. (Phillipson's Wheaton, 795 *et seq.*) Mr. William Beach Lawrence considers that the success of these negotiations with Denmark, in which that country agreed by treaty of 1830 to pay indemnity of \$650,000, was "in a great degree, to be attributed to the personal character and special quali-

ties of Mr. Wheaton." Lawrence disagrees with the views of Wheaton, as do also Snow and Rivier, and it seems that if the question should arise again the United States would not attempt to follow the line of argument advanced in the negotiations with Denmark.

PROCEDURE

In different treaties, efforts have been made from time to time to prescribe the procedure in which the right of visit and search should be exercised. These, together with well-established custom and usage, resulted in a quite well-standardized procedure, as an example of which may be cited the following extract from the instructions of Rear Admiral William T. Sampson, U. S. Navy, during the war with Spain, as contained in Squadron General Order No. 10, of June 11, 1898:

The following directions are given, subject to any special treaty provisions: After firing a blank charge and causing the vessel to lie to, the cruiser should send a small boat, no larger than a whaleboat, with an officer to conduct the search. There may be arms in the boat, but the men should not wear them on their persons. The officer wearing only his side arms, and accompanied on board by not more than two of his boat's crew, unarmed, should first examine the vessel's papers to ascertain her nationality and her ports of departure and destination. If she is neutral and trading between neutral ports the search goes no further. If she is neutral and bound to an enemy's port not blockaded, the papers which indicate the character of the cargo should be examined. If these show contraband of war, the vessel should be seized; if not she should be set free. No sealed hatches should be broken nor any examination of the cargo made.

It will be noted how zealously the rights of the neutral were protected by this procedure, and how considerably the practice of the belligerents in the present war has differed from it. The present instructions for the U. S. Navy governing maritime warfare, of June, 1917, prescribe a procedure for visit and search far more drastic than that used in 1898.

Before summoning a vessel to lie to, which may be done also by international signal, a ship of war must hoist her own national flag. If the summoned vessel refuses to lie to, resists, or takes to flight, she may, even though neutral, be pursued and brought to, by the use of such forcible measures as may be necessary. A shot across her bows should precede actual firing into her. If the vessel after having been visited is released, an entry to that effect

should be made in the log book by the boarding officer, a form for this purpose being prescribed for the U. S. Navy.

The subject of the results of resistance to visit and search, and the application of this principle to neutral vessels in belligerent convoy, is somewhat beyond this discussion of the right of visit and search. However, it may not be inappropriate to add that the Declaration of London covers this question fully and provides that forcible resistance to the legitimate exercise of this right involves in all cases the condemnation of the resisting vessel. Furthermore, goods belonging to the master of the vessel or its owner are treated as enemy goods, and the cargo is liable to the same treatment as that of an enemy vessel. An attempt to escape is not considered as forcible resistance, and, although force can be used to overcome either resistance or flight, condemnation follows forcible resistance alone. Authority given privately-owned vessels to carry arms for protection does not give it exemption from proper visit and search.

EXCEPTIONAL APPLICABILITY IN TIME OF PEACE

Although the right of visit and search is essentially a *belligerent* right, and is treated only from this aspect in this article, it should not be overlooked that it exists in certain limited respects in time of peace. Thus by many states it is recognized as legitimate in operations toward the suppression of the slave trade and other forms of piracy which are now generally prohibited by all civilized nations. Many treaties between foreign powers expressly recognize the right in such cases, especially with regard to suspicious vessels on the East Coast of Africa. Although the United States, largely because of its traditional aversion to the improper exercise of the right of visit and search, has generally opposed the extension of this right to its vessels, even in cases of suspected slave trading, it has recognized the "right of approach" to better determine circumstances of guilt in such cases (Stockton's Manual, p. 104). It must be recognized that this opposition to the more definite exercise of the right of visit and search with regard to suspected slave traders was contrary to the general attitude of the rest of the world.

Also in time of peace vessels in the territorial waters of a state may be visited and searched if necessary, in enforcement of the

customs regulations, and such action may even be taken on the high seas, when, while pursued by a vessel engaged in enforcing the revenue laws, the offending vessel has escaped from territorial waters.

INFLUENCE OF THE GREAT WAR

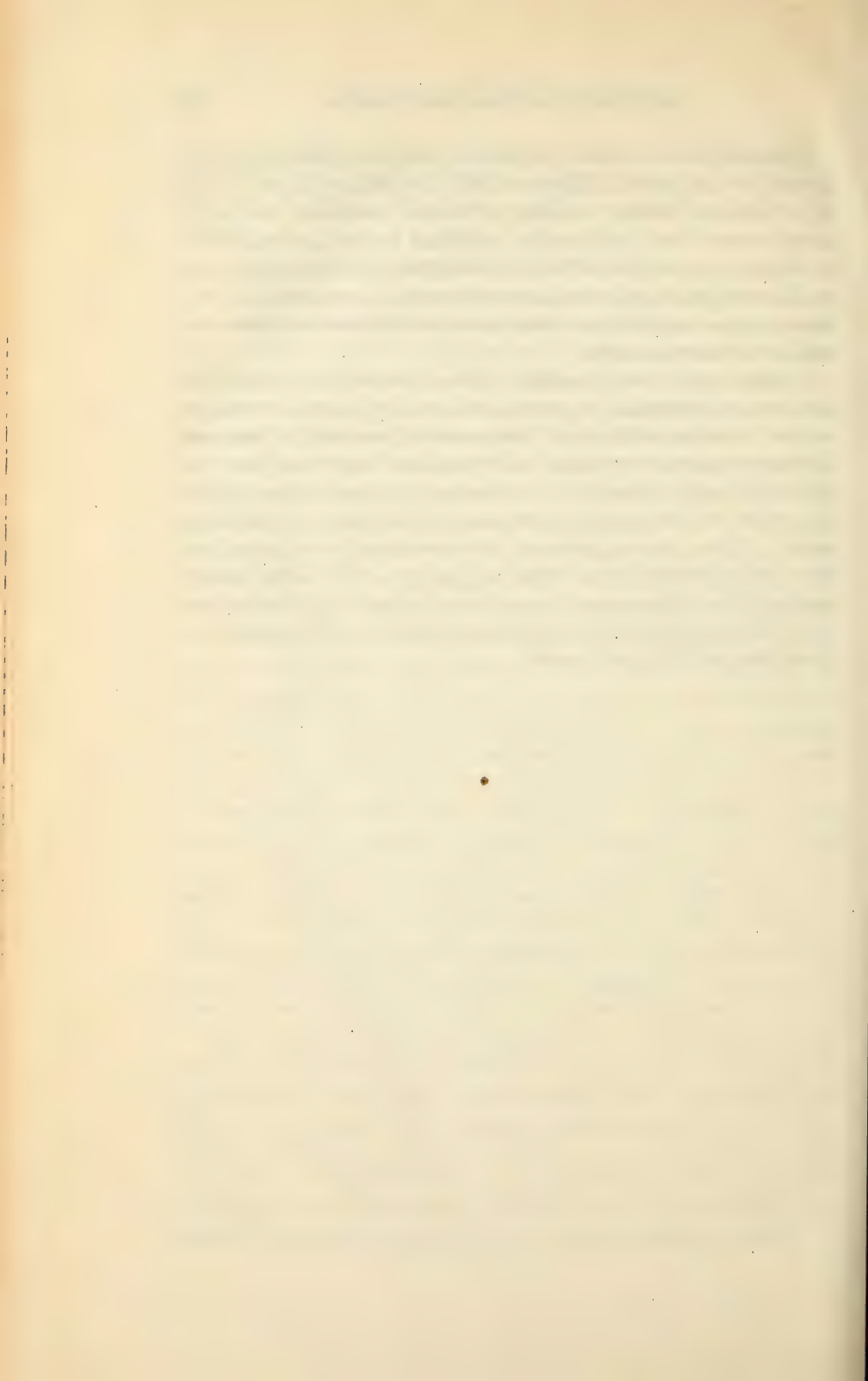
It is as yet too early, besides being somewhat inopportune under existing circumstances, to speculate as to what may be the result of practices during the present war on the accepted principles of the right of visit and search. Suffice it to say that in this connection, as in many others, the previously accepted tenets of International Law have been modified in certain respects.

Perhaps the most important development in the actual practice of this right during the present war has grown up from the contention that it is no longer possible to conduct it on the high seas with sufficient protection of the rights of the belligerent concerned. Merchant vessels have grown to such tremendous size that it is impossible to conduct a sufficiently thorough search, necessitated by the means adopted to prevent detection of contraband, except by systematic unloading of much of the cargo, which can only be done in port. Also, the motion of the ship at sea often prevents disturbing the cargo, and in small vessels it is often impossible to open certain cargo holds without serious danger from seas coming aboard in the heavy weather that is often experienced. Furthermore, since the high development of the efficiency of the submarine, it is a matter of too much danger for a war vessel to remain lying to near a merchantman for the purpose of conducting a search. Therefore it has become the practice for belligerents to require neutral merchantmen to come into port for examination of their cargo, thus departing from the previously accepted policy that such vessels were to be delayed as little as possible, and not diverted from their course for this purpose.

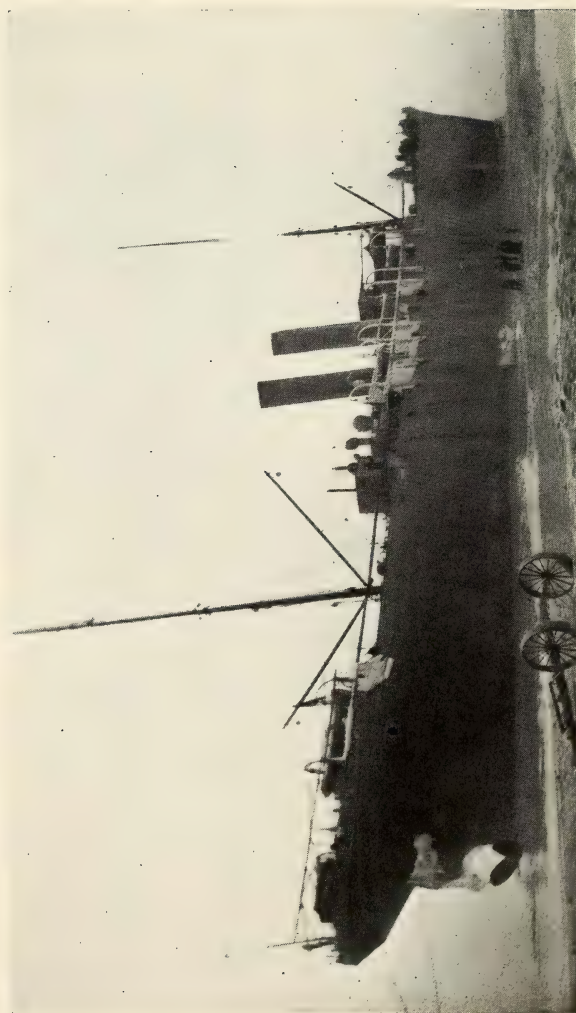
Also military necessity has been urged as demanding a greater degree of supervision over neutral mails than had been accepted as permissible in the past. As previously noted, this subject has been a troublesome one throughout the development of the principle of the right of visit and search, and it is hoped that the necessities of belligerents and the rights of neutrals may soon be harmonized by conventional agreement in this respect, into a recognized rule giving proper weight to both interests involved.

Comment is not deemed necessary upon the astounding policy adopted by one of the belligerents, that the indiscriminate sinking by submarines without warning of neutral merchant vessels entering certain zones, arbitrarily established by that government, is justifiable; this in spite of the long-established principle that, even in the rare instances when destruction of a good prize is warranted, it can only follow a determination of character from visit and, if necessary, search.

In cases where the principles of the International Law of the past have been invoked by neutrals in behalf of their interests, the replies from the belligerents have usually asserted the necessity of changes therein due to the well-recognized creation of new conditions in modern warfare. It remains to be seen what will be the result of the present complicated condition of conflicting views. When the exigencies of the emergency have passed and the calm judgment of the world is available, will be the time to pass on this all-important question of what shall survive and what shall be discarded in the International Law of the future on the subject of Visit and Search.







PHOTOGRAPH No. 2.

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SALVAGE OF THE ARGENTINE NAVAL TRANSPORT
PAMPA

By CAPTAIN L. H. CHANDLER, U. S. Navy

On December 30, 1917, in a heavy snow storm, the Argentine Naval Transport *Pampa* went aground about a mile to the northward of Caffey's Inlet Coast Guard Station, on the North Carolina Coast. The salvage operations that followed and finally succeeded presented some features that may not be generally known to naval officers, and may therefore be of interest and value to them, although, of course, perfectly familiar to men who make a profession of the salvage of ships. The most valuable lesson to be learned from the procedure is the extent to which it is possible to haul a heavy ship through sand or gravel in a depth of water far less than her draft, by keeping up a steady pull on her and allowing currents and sea to work the sand or gravel around her; in other words to "worry her through it."

The U. S. S. *New Hampshire* was ordered to the scene of the grounding to assist in the work and her commanding officer was directed to assume charge thereof. She arrived at daylight on the morning of January 2, 1918, and found the *Pampa* broadside on to the beach, with her head to the northward, the coast line here trending about northnorthwest and southsoutheast. Her general position is shown in Photograph No. 1, which was unfortunately taken at a very considerable distance from the ship, and is depicted more in detail in Diagram No. 1

The *Pampa* is a naval transport built on general merchant ship lines, being about 390' long, and of 6000 tons displacement when loaded and of 2700 tons net burden. She was light when she grounded and drew 10' 6" forward and 13' aft. As she lay on the beach she had 9' of water alongside on the offshore side, and 3' on the inshore side. As she lay, there was about 12' of water not far outside, and at about a ship's length offshore was a bar having not more than 7' of water on it at high water, and running

parallel to the beach for a considerable distance each way. This bar was about half the length of the ship in width, and the sea broke on it in any except the smoothest weather.

The *Pampa* had apparently jumped this bar and gone inside it when she grounded, thereby getting well inside the heavier breakers, and had accomplished this without seriously damaging herself. She had lost her rudder and rudder post. She had started a seam in one of her port bunkers, but this had been handled by her own crew by the use of hammocks, mattresses, etc., placed over it and held down by planks, with shores and wedges. It never gave any trouble. In trying to back off when



PHOTOGRAPH No. 1.

she grounded, she had filled her main condenser and piping generally with sand, and her engines were no longer available. Shortage of fresh water had also compelled her to salt her boilers. Aside from this she was apparently uninjured, but was short of coal.

When the *New Hampshire* arrived there were found present the Merritt and Chapman Wrecking Company's tug *Rescue* (Ransone, master; Carlson, wrecking master), the Coast Guard Cutter *Seminole* (Lieutenant Blake, commanding), and the navy tug *Gorgona* (Ensign G. Freudendorf, commanding). These ships were anchored as shown on Diagram No. 1. The *Rescue* had her stern in about 16' of water and about 50 yards from the breakers, which were then heavy, as a fresh northeast wind was blowing, with passing snow squalls. The *Rescue* tried to send her surf boat in with a line, but when the boat reached the surf she had to cut

the line and make the best of her way to the beach. The *Rescue* then finally succeeded in floating a line down to the *Pampa* on a buoy, and by evening had run a tow line to her. This was the situation on the evening of January 2.

During that evening the wind and sea rose so that the *Rescue* had to let go her line, and all the small craft had to move further out and anchor in deeper water. The *Rescue* bumped before she finally got out. About 1 a. m., January 3, the wind and sea became heavier, and all ships had to put to sea. The *New Hampshire* lost an anchor and disabled her windlass, the *Rescue* lost an anchor and chain, the *Seminole* lost an anchor and chain and had boiler

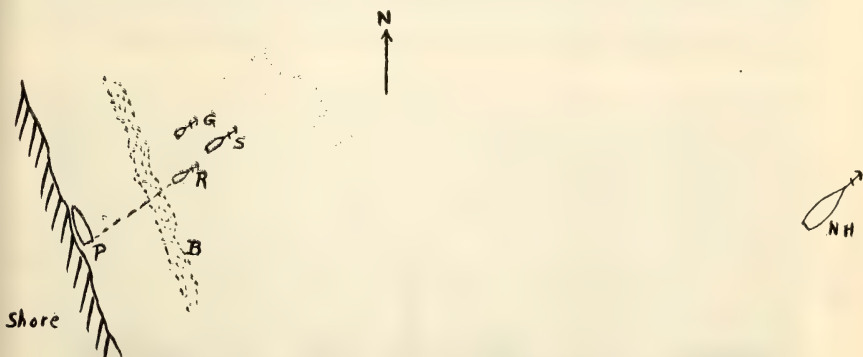


DIAGRAM NO. 1.—POSITION ON JANUARY 2, 1918.

P—*Pampa*. She drew before grounding 10' 6" forward and 13' aft. As she lies she has 9' of water on starboard side and 3' of water on port side. She is 390' long, of about 6000 tons displacement and 2700 tons net burden.

R—*Rescue* (Merritt and Chapman wrecking tug) trying to float a buoy to *Pampa*. By this means a 10" line was run on January 2, but work had to be abandoned on account of storm before it could be used, and it washed ashore.

G—*Gorgona* (navy tug).

S—*Seminole* (Coast Guard Cutter).

NH—*New Hampshire*.

B—Bar of gravel with not more than 7' of water on it, running parallel to beach and extending over 1000 yards to northward and over a mile to southward. When there is any swell the sea breaks on this, and if heavy, outside it. This bar is of gravel like the beach, which works easily and does not pack like fine sand. With northerly winds the current sweeps down the beach to the southward sweeping gravel with it. This current during a northerly blow appears to reach a velocity as high as 2 knots an hour and was running very strong on January 2. With southerly winds there is a weaker current setting to the northward. The shore line and the bar extend in about a northnorthwest-southsoutheast direction. The bar is about one-half the length of the *Pampa* in width. At the outer edge of the bar the water deepens gradually to a depth of 16 feet at about 300 feet from the bar,

troubles, and the *Gorgona* had difficulty in getting out. Bad weather continuing, the ships did not get back until January 4, on which day the U. S. S. *Lebanon* (Ensign H. N. Huxford, commanding) had also arrived. The *Seminole* did not return.

Upon our return it was found that the northeasterly wind and sea, and the southerly current had turned the *Pampa* through practically 180° in azimuth, and she was now heading to the southward, as shown in Photographs Nos. 2 and 3, and in Diagram No. 2. She had suffered no further damage. It was learned that as she turned around an effort was made to hold her with her head offshore and pointed to the northward and eastward by letting go one of her anchors, but the chain carried away, the anchor was lost, and the ship swung on around to the position shown. So



PHOTOGRAPH No. 3.

far as depths of water and general position were concerned, her condition was practically the same as before except for the change in heading. The line run by the *Rescue* had been washed ashore and hauled aboard the *Pampa*.

As the weather was moderating, the work of preparation was started, and the plan is shown on Diagram No. 2. The *Rescue* and *Lebanon* anchored as shown, and ran 10" lines about 500 fathoms long to the *Pampa*, that from the *Rescue* running to the *Pampa's* starboard quarter. Difficulty was experienced in finding anything on the stern of the *Pampa* of sufficient strength to hold lines, and her rudder head casting was about the only hold available. The *Rescue* planted a 9000-pound anchor as shown, with a 15" cable laid hawser to the *Pampa*, also about 500 fathoms

in length, with heavy three-fold purchases on board the *Pampa* on which a strain was kept by the use of her winches. From the general arrangement shown on the diagram it will be seen that it was planned to heave her stern out so that she could finally be worked through the gravel, stern first. January 5, was occupied in this work.

All being ready, at high water during the night of January 5-6, strain was put on all the lines, and the *Pampa* made her first move, going astern about 25' and swinging her stern out about 2°. From this time on strain was kept on the anchor-line at all times, and the tugs pulled during the upper half of each tide. Sometimes good progress was made and sometimes little, depending upon wind, sea and tide. The work became very discouraging at times,

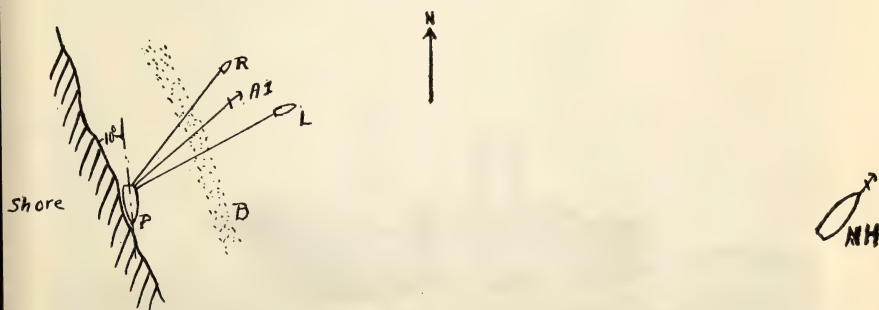


DIAGRAM NO. 2.—POSITION ON JANUARY 4 BEFORE PUTTING STRAIN ON LINES, AND AFTER THE BLOW OF JANUARY 3.

P—*Pampa*, turned around by current and swell during blow of January 3.
R—*Rescue*, with 10" line fast to starboard quarter of *Pampa*. Length of line 480 fms.

L—*Lebanon* (navy tug), with 10" line fast to port quarter of *Pampa*. Length of line 480 fms.

A—A 9000-pound anchor planted by *Rescue*, with a 15" line from stern of *Pampa*, 480 fms. in length, with heavy purchases on board *Pampa* kept taut by use of her winches.

Strain was kept on anchor at all times and tugs pulled at high water. The *Pampa* slowly turned and slid along on an arc of a circle until she reached the position shown on the next diagram.

for there followed a two-week period of almost unbroken westerly weather, during which there was not enough swell to work the ship and practically no current. What was really needed for quick salvage would have been a couple of smooth days at first to enable the gear to be properly arranged, and after that moderate northerly or northeasterly weather to maintain just swell enough to work the ship without pounding her, and to set up a southerly set.

Whenever we had any current and whenever the ship was working in the swell good progress was made; when the sea was smooth and there was no current but little was gained. However, it is probable that the conditions as they existed were the safer, and that they resulted in less damage to the ship, although the work took much longer.

By the morning of January 9, the *Pampa's* stern had been hauled out about 45° in azimuth, and she had been moved astern nearly



PHOTOGRAPH No. 4.

500', and this hauled her stern into the outlying bar. She had about 300 tons of water ballast in her forward trimming tank, and her after tank was empty. Photograph No. 4 shows her stern up on the bar and her bow down in the deeper water inshore.

Between January 9 and January 11, the *Rescue* laid out another 9000-pound anchor with 15" line and purchases aboard the *Pampa* and the situation was then as shown in Diagram No. 3 and Photograph No. 4.

On January 12, at about 1 a. m., the wind and sea came in strong from the southward and eastward and all ships had to let go everything and move further out. Strain was kept on the anchor lines, however, and by this means during the night, the sea helping, the

big gain of the operation was made, being a swing in azimuth of about 15° and in distance of about 125'. Captain Carlson, who was directing operations aboard the *Pampa*, thinks that he could have undoubtedly hauled the ship off at that tide, but knowing that there were no tugs at hand to take her, he only hauled as far as he could without getting her into surf heavy enough to pound her, then made her fast and held her to await the return of the tugs.

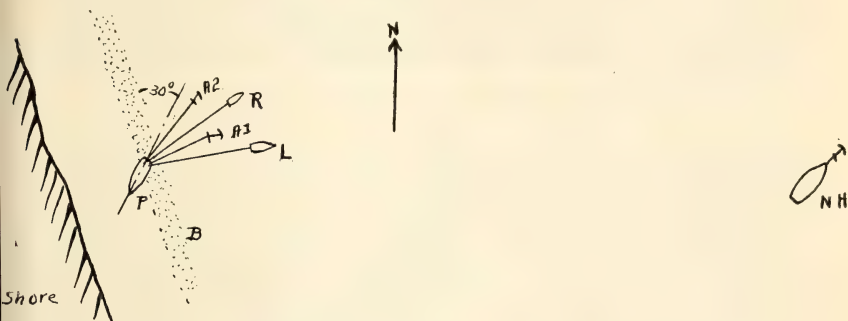


DIAGRAM NO. 3.—POSITION ON JANUARY 11, BEFORE THE BLOW OF MORNING OF JANUARY 12.

P—*Pampa*, with stern on bar and raised and bow down in deeper water inside bar, with 300 tons of water in forward trimming tank.

R—*Rescue*, as before, but line shorter by distance *Pampa* has moved. Tugs lie with anchor down and as *Pampa* moves takes in on lines.

L—*Lebanon* as before, but with shorter line.

A1—Anchor as before, but with shorter line.

A2—A second 9000-pound anchor with 15" line, laid to assist in hauling and as a preventer in case of a northeasterly gale.

While in this position a southeasterly blow came on in the early morning of January 12 which forced *Rescue* and *Lebanon* to let go lines and get out of surf. The lines washed ashore, but strain was kept on the anchor lines and with the surf moving her the *Pampa* swung her stern out until her keel made an angle of 45° with axis of bar, and moved about 125' to position shown on next diagram. Blow was of short duration, but afternoon of January 12 and most of January 13 were spent in running lines for tugs again and in replacing anchors, *A2* having dragged home under strain.

On January 13, anchors were relaid, lines readjusted, etc., and the situation was then as shown in Photograph No. 5 and Diagram No. 4. The *Pampa* was at this time on top of the bar and soon came on an even keel in trim, her stern being then in 12' of water. From this point the hauling was "down hill," and water ballast was shifted from forward to aft, and strain was kept continuously on the anchors and at favorable tides by the tugs, which work continued until the morning of January 16, when, at 9 a. m., the ship came clear.

During the operation the normal rise of tide seemed to be about 2', but with strong, westerly winds it was reduced much below that, which was of course an additional drawback.

As soon as the *Pampa* came off the *Lebanon* took her in tow and started with her for port. The *Gorgona* towed astern of the *Pampa* and did the steering, to replace the *Pampa's* lost rudder. The *Rescue* picked up her wrecking anchors and rejoined, and in the early evening the ships all anchored in sheltered water. On the morning of January 17, they all got underway, the *Rescue* on one quarter of the *Pampa* and the *Gorgona* on the other and all proceeded to port.



PHOTOGRAPH No. 5.

Summarizing the facts in regard to this method of salvage it may be said that the problem was to take a large ship very high out of water, broadside practically against the shore, on a gravel beach, and haul her out through the gravel into deep water, the problem being made more difficult by the fact that she was inside a gravel bar having not more than 7' of water on it at high tide. The description, sketches, and photographs given show the several steps. The sketches do not pretend to be exact as to scale, and in fact show the bar rather farther off shore than it really is.

The only possible way of doing the work was thought to be to get hold of one end of the ship and haul it around into such posi-

tion that we could get a straight haul along the keel line. The northernmost end (finally the stern) was selected because it was already canted out about one point from the coast line, and also because when the current is strong, with northerly and northeasterly winds, it runs down the beach from north to south. There is rarely much northerly set at this time of year. When so running it was expected that this current would pack the gravel in between the ship and the beach, at the same time washing it away from the other side, thus wedging her away from the beach. Also the most dangerous prevailing gales are from the northward and eastward, and by hauling the stern off it was hoped to get her stern on to

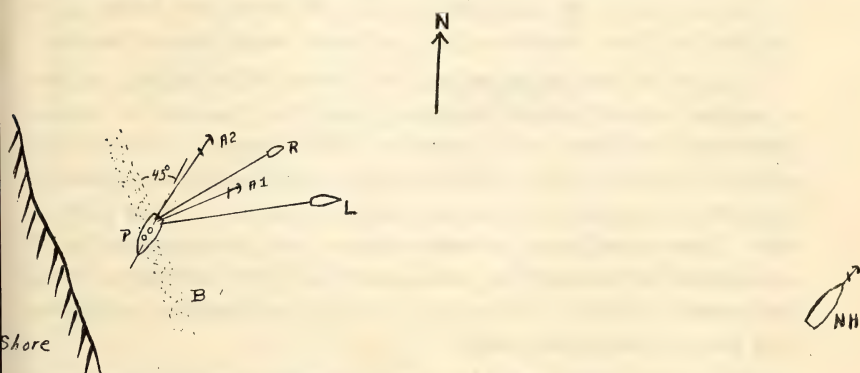


DIAGRAM NO. 4.—POSITION ON JANUARY 13, AFTER LINES HAD BEEN RERUN, ANCHORS RELAID, ETC., FOLLOWING BLOW OF JANUARY 12.

P—*Pampa*, setting on bar, with stern just outside it, and inner edge of bar under forward funnel, with keel at angle of 45° with axis of bar. Stern over about 12' of water.

R—*Rescue*, as before, with line rerun.

L—*Lebanon*, as before, with line rerun.

A1—Anchors as before, but relaid.

A2—Anchors as before, but relaid.

any probable really dangerous storm and hold her thus end on to it by the anchors laid outside the surf.

Having the anchors once planted, with the tugs hauling in the same general directions, all that was necessary was to keep a steady strain and wait until the effects of current, sea, and working of ship should work her through the gravel into the deeper water that lay about a ship's length outside the bar.

There were several points in connection with the work that are worthy of comment, one being the fact that throughout it was

necessary to keep putting coal aboard the *Pampa* whenever the sea would permit, her coal supply being very short, and power for her winches being an absolute necessity. This was done by sending in from three to five tons at a time in bags in the 40' motor sailing launches. A total of about 20 tons was put aboard her. Even in the smoothest weather there was enough surf to make this service very difficult and very hard on the boats, especially when the landing had to be made on the offshore side of the *Pampa*. After her stern had been hauled out the boats could get around inside her and she furnished a lee, although the boats not infrequently touched in the surf in getting in. We also had to coal the *Rescue* twice, the coal shortage in her home port being such that she had been unable to get a sufficient supply before leaving.

In regard to the strain put on the *Pampa* while hauling, it was a surprise when Captain Ransone stated that, beyond a certain point there was little to be gained by added power. He was well satisfied that the work could be equally well done, and almost if not quite, as quickly by one tug and one anchor as with two of each. It seems to be not so much a case of very heavy strain, as of a moderate but unrelenting strain, combined with working of ship and gravel or sand. Having two tugs and two anchors available, they were of course all used.

With a light ship, as in this case, in hauling her off it becomes necessary to watch the question of stability, as many merchant built ships are very lacking in stability when empty, and when only partly water borne may develop a danger heel or perhaps capsize. This may also happen after floating clear. So it is necessary to watch this point, and if needed to admit water ballast as she moves off the shoal.

A procedure of great interest, which it did not become necessary to use in this case, however, was described by Captain Ransone to the writer, and is shown on Diagram No. 5. This is employed when the tug is hauling on a line from a stranded ship, when circumstances do not permit the tug to keep her anchor down while at work, and yet some device is necessary to keep the tug from being set down sideways by wind, current, or sea, perhaps into the breakers. By rigging a bridle as shown on the diagram, and by hauling or slacking on it as requisite, the tug may be steered and

made to steam against the current, etc., as may be necessary to keep her in proper position.

Some words may also be of interest in regard to the organization employed by the wrecking company in such a case. They have two masters aboard the tug, a tug master, in this case Captain Ransone, and a wrecking master, Captain Carlson. Upon reaching the ship to be salvaged Captain Carlson goes aboard her with a sufficient force (in this case about a dozen men) and takes charge of the work there, being in direct charge of all operations; Captain Ransone having charge of handling the tug as necessary. As

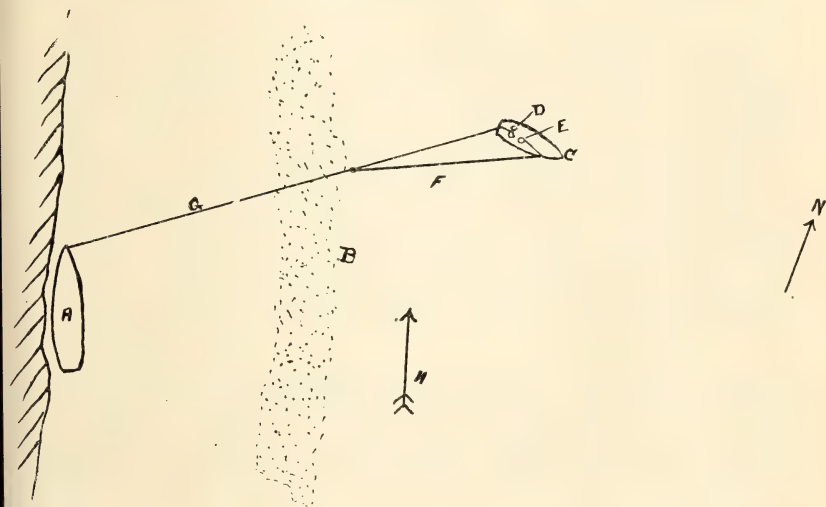


DIAGRAM No. 5.

A—Ship aground.

B—Breakers.

C—Tug.

D—Towing bitts.

E—Capstan or windlass.

F—Bridle from windlass led through bow chock on proper side and made fast to tow rope about 20 or 30 fms. from stern of tug.

G—Tow rope.

H—Arrow showing set of current.

soon as the ship floats, however, Captain Ransone assumes charge and responsibility. It is evident that this is a case where team work and cooperation are highly necessary, and they could be found in no higher degree than in this particular instance. Both Captain Ransone and Captain Carlson are men of the highest type. They are experienced wreckers, most competent and bold seamen, and

furthermore most excellent men with whom to carry on work. Their cooperation and general attitude throughout were perfect. They gave freely, fully, and without reserve of their knowledge, experience and effort, and with the well-designed and equipped *Rescue* and her gear, were the main reliance in accomplishing this work.

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A COMPARISON BETWEEN THE LOGISTICS OF ARMIES AND FLEETS¹

By MAJOR ROBERT E. WYLLIE, C. A. C.

Webster's Dictionary defines logistics as "that branch of the military art which embraces the details of transport and supply," and no extended reflection is needed to see the immense importance of the subject. Fleets and armies cannot carry out strategic plans unless they are furnished with the supplies necessary to enable them to move, live, and fight. This is so self-evident that it seems like a waste of time to mention it, nevertheless history teaches us that many a campaign has been lost through failure to properly plan the logistic element, and it is doubtful if even one can be found in which the question of supplies did not play a determining part.

A strategic plan is valueless unless based on sound logistics. It is only the latter which makes the plan practicable; it is the foundation on which strategy builds, and the strength of the resulting edifice is measured directly by the security of the foundation.

From a strategic point of view this country occupies an insular position, in that practically all military operations against foreign nations involve the use of the seas. Our only neighbors are Canada and Mexico. The former would be supported by troops brought overseas from Great Britain, and major operations against Mexico can only be carried out from such ports as Vera Cruz, Tampico, etc. Northern Mexico is too barren and difficult for large bodies of troops. The importance of amphibious warfare to this country is self-evident. Following up this line of thought it might be well to compare the logistics of land and naval forces,

¹ This article was written in January, 1916. Reprinted by courtesy of *The Journal of the U. S. Artillery* from the September-December number, 1917.

and then take up the logistics of a combined overseas expedition. The strategy of the two services is essentially the same, but their logistics afford some interesting differences, so that a thorough appreciation thereof is essential when planning combined operations, and inasmuch as we are usually prone to neglect the logistics of even our own service, ignorance of the logistic requirements of the other can be expected as a general thing.

The first necessities of both fleets and armies are food, clothing, ammunition, and personal equipment. These are needed to keep the fighting forces ready for action. It is also evident that they must be supplied from some secure points or bases and must be safely delivered to the combatant units. The element of security, so essential for a base, requires that it be in our own territory, in order that it can be properly stocked and fortified during peace.

We now come to a distinction between land and naval forces. Assuming offensive movements, without which no decisive results can be expected, land forces invading an enemy's territory must have temporary bases nearer the front than the main depots in their own country, from which supplies can be delivered to the units at the front. A few figures will be given to render this thoroughly comprehensible.

A division is the smallest normal body of troops containing all arms, and it is the basis of army organization. In our service it contains approximately 24,000 men, 72 guns, 9000 animals and 1000 vehicles (including ammunition caissons).² The wagons carry ammunition and the supplies needed for five days. The length of a division in road column without distances is about 16 miles, of which the wagons take up almost exactly half. In other words the supplies for five days occupy as much road space as do the combatant units. Assuming that the wagons are mule-drawn, that the roads are good, and that nothing can be obtained from the country itself, the division cannot advance more than about 30 miles from its immediate base, or refilling point, or the rate of consumption will become greater than the rate of supply. Even this figure will be decreased if more than one division is supplied over the same road. It will also be noted that this presupposes good roads, and even the best will soon be cut up by such a large amount of heavy traffic.

² Old tables of organization.

This immediate base is called an advance depot, and is usually a railhead, though motor truck trains can be used when available to extend the depot beyond the railhead, but the limit is soon reached even with motor trucks.

The absolute dependence of an army upon its line of communications, through the advance depot and railroad to the home bases, is thus evident. An advancing army literally lives from day to day, and the immediate rear is filled with supply wagons, hurrying to and from the railhead, and the latter must be pushed forward with all possible rapidity if the advance of the troops is not to be retarded.

The security of this line of communications is evidently vital. Every day's march into hostile territory requires more combatant troops to guard the transportation of supplies, and to provide for the restoration of order and the governance of the occupied region, and this soon becomes an immense drain on the fighting forces. In 1812, Napoleon crossed the Niemen with 363,000 men, and arrived at Moscow with but 95,000, leaving 118,000 to guard his line of communications, 550 miles in length,³ and we all know that it was the weakness of that line which was the real cause of his discomfiture in that campaign. In 1870, the Prussians arrived before Paris with 171,000 men, leaving 254,000 in their rear to the Prussian border, 210 miles away. In this case the line of communications was secure, but it required an immense number of men, compared with the troops at the front.³

Not only must the needs of the combat troops be met, but the requirements in the occupied territory are enormous. We have already seen that supplies of food, clothing, ammunition, and personal equipment are needed by all services, but along the line of communications, and in the occupied region, there will be much more. The railroads must be repaired, kept in condition and operated, and perhaps new lines constructed. Behind the present lines in France is a network of new narrow gauge roads constructed since trench warfare began. During Kitchener's expedition to Khartum the railroad was pushed along behind the troops, new construction, at the rate of two miles a day.⁴ The present British expedition across the Sinai peninsula into Palestine has been rendered possible only because of the railroad which

³ Yorck's "Napoleon as a General."

⁴ MacDonnell's "Military Geography."

they are building as they advance. It is very evident that large supplies of engineering and railroad material are involved. The roads must be kept in condition for the heavy traffic which uses them; telegraph and telephone service must likewise be kept going, and probably extended; hospitals are established and supplied; there will be a constant stream of travel going each way; reinforcements, recruits, remounts, going to the front, wounded to the rear. To reduce the number of men required for defence, all positions of importance must be artificially strengthened. This requires lumber, barbed wire, tools, etc., in quantities depending on the extent of the defences. Shops will be established, when possible, for the repair of artillery, machine guns, small arms, etc. The government of the territory must be provided for, and the transportation of civilians therein, not to mention the supplies necessary for them, in food, clothing, shelter, medicines, etc., which may not be locally procurable owing to the devastation wrought by war. It is obvious that no general estimate can be made of logistic requirements in this direction; it depends entirely on circumstances. Even if new work (such as new railroads, new roads, construction of defences, etc.), and what might be called the civil requirements be omitted, and only the necessities of strictly military maintenance be considered, it is very indeterminate, so much so that a set of estimates made by capable officers of the amounts to be transported along the line of communications, varied from 20 to 50 pounds per man per day. Probably 30 pounds can be taken as an average for this study.

Now, taking the naval side it will be seen that the differences that exist between the logistics of land and sea warfare are marked, as soon as the primary requirements of food, clothing, ammunition, and personal equipment are passed. Whereas an army lives from day to day on its line of communications, a fleet can carry several months' supplies of those important commodities, it is self-sustaining, so far as they are concerned, for long periods of time, so much so that were it not for the question of mobility, a fleet would hardly need a line of communication at all.

Mobility, however, is of vital importance; a fleet is valueless without the power to move, and this requires: (1) fuel, (2) docking and repair facilities.

The need of fuel is obvious and it is the feature which controls the distance that the fleet can operate from its refilling point. We have seen that food requirements limit the advance of an army to a distance of about 30 miles from its advance depot; that may be called the radius of action of a land force. The radius of a ship is determined by the amount of fuel it can carry. No rule can be laid down for a fleet, because the radii of its units vary so greatly, so much depends on the kind of vessels, and the projected operations. However, a refueling point within the theatre of operations is just as essential to a fleet as is an advance depot for an army. A few facts as to the quantities of fuel involved will now be given, in order that they can be compared with the army needs.

It has been estimated that our present Atlantic fleet would require over 200,000 tons of coal, and 60,000 tons of fuel oil every month on active operations, and this means that, when supplied from an advanced base in the Philippines, about 160 ships, with an average gross tonnage of 5000, would be needed to keep up the supply from home ports. The food for the fleet amounts to but 3500 tons per month. This comparison will probably give the soldier a better idea of the immense quantities of fuel required than could be given in any other way. In fact 10 ships will probably be enough to keep up the supply of food, clothing, and all other naval stores needed for the fleet in the Philippines and for the bases oversea.

The second essential, docking and repair facilities, is not so well appreciated outside of naval circles. Ships on active service require frequent overhauling and repairs, and docking is essential for this purpose. Repair vessels accompany a fleet as part of the train, but extended work from them is not possible. Work of this character must be done in port. The deterioration in mobility and fighting strength of a fleet without access to docking and repair facilities is so great that no navy could consider such a condition of affairs. This requirement means that a base is needed for the fleet, and it must have (1) a good strategic position relative to the theatre of war, and to the lines of communication with home ports, if it is in distant waters; (2) it must have strength, in order that it can resist the efforts of the enemy to capture it; and (3) resources, the docking and repair facilities required, a harbor of sufficient size, the necessary labor and supplies.

A consideration of these three requirements shows that such a base cannot be made in a day. It is very different from a mere refueling or refilling point. It must be prepared in time of peace. Comparing it with an army base it resembles the home depots, while the advanced base or refueling point, is similar to an army advance depot or railhead.

A naval advanced base affords a fairly secure shelter for the fleet in the intervals between active operations, and stores of food, fuel, and ammunition can there be replenished; for more than that it must return to a well equipped permanent base, such as described above.

It follows that reasonable preparedness demands that permanent bases be selected, equipped, and fortified, in time of peace, as near the probable theatre of operations as our territory permits. If such bases are secure the fleet will not be under any anxiety regarding them, and can conduct its campaign with the knowledge that its logistics has been amply provided for.

In the security of a line of communications, including the bases, there is a vast difference in the land and naval problems. As just shown, a fleet is really not charged with the security of its own bases. No portion of the sea-going fleet is (or should be) tied up in the defence of any locality. Obsolete vessels can be well utilized in such a manner, but it is contrary to all strategic principles to so employ any vessel which can be utilized for offensive operations at the front. The defence of a base rests with land forces and with the offensive activities of the fleet.

Supplies for the fleet passing along the line of communications are not confined to roads. There are no set paths for them to traverse, and distances, in the general case, are great. Further, large quantities of supplies can be conveyed at a time (when compared with the capacity of a wagon train), so that the condition of a naval line of communications is vastly different from that existing in the rear of an army. In one case we have isolated groups of ships passing over large areas, along routes that can be varied at will; in the other case, a continual stream of supplies along roads which are as well known to the enemy as to us. The difference is so marked that a soldier can be excused for saying that a fleet has no line of communications in the army sense.

The natural difficulties which an enemy would encounter in making a raid on a naval line of communications are immeasur-

ably greater than a similar operation on land, and from this it follows that a very small proportion of the fleet is needed to guard the line of communications, while we have already seen how greatly an army is denuded for this purpose. It is undoubtedly true that no complete parallel can be drawn between land and naval lines of communication, and if the effect of logistics in land strategy is applied directly to naval warfare, the result will be fallacious.

The fleet has no problem similar to that which confronts an army in occupying and governing enemy territory; on the other hand we must remember that this entire discussion of naval logistics presupposes good and sufficient bases, well protected and prepared. If this is not the case the fleet is practically helpless for the prosecution of its proper offensive operations, as it is tied to such base as it may possess, in a manner very similar to that of an army, but without the latter's opportunities for action. The security of the base is then an ever-present problem; in the face of superior forces the fleet cannot protect it, neither can the base protect the fleet. At the same time the fleet is not able to attempt anything else. If the enemy is inferior, the fleet by its presence will hold the base, but that will be of no value strategically. The base should exist for the fleet, not the fleet for the base.

In other words if the question of bases has been properly attended to in time of peace, the logistics of a fleet in war is a simple matter compared with that of an army (this means, of course, so far as its effect on strategy is concerned), but if those precautions have been neglected, the fleet is practically helpless, and its power nullified; while in land operations logistics is a war problem, pure and simple, nothing can be done in time of peace (except to collect supplies), not even for a defensive campaign in our own country. An army commander can never be free from the logistic problem, while with proper preparedness, logistics should have no deterrent effect on naval strategy. This is the essential difference between the two services, and its effects are so important that every advantage should be taken in time of peace to secure this great advantage to the fleet.

Let us now consider the logistic requirements of a joint overseas expedition. For example our fleet operating in Far Eastern waters, with an advanced base in the Philippines, getting all supplies

from home ports, and a land force of 100,000 men of all arms sent to recapture Luzon, or to undertake an expedition against enemy territory. This force will be too small, in all probability, for such a purpose, but it is a convenient figure to handle, and will give an idea of the problem involved.

We have already seen that to maintain the fleet under these conditions will require fuel ships with a gross tonnage of about 800,000, and 50,000 tons for other supplies, as follows:

	Carrying capacity	Gross tonnage
Colliers	925,000	670,000
Oil Tankers	172,000	137,000
Other supplies	60,000	50,000

In addition to these items the navy would probably require the following merchant ships upon mobilization:

For	Sh'ps	Gross tons ⁵
Fleet Scouts	8	65,885
Train	30	161,440 ⁶

Now let us consider the army needs in transports. The army generally uses the following figures in estimating the amount of tonnage required for an expedition: for gross tons per man, nine per animal, 10 per gun or other vehicle. Assuming a force with the different arms proportioned as in a normal division, and reducing the above figures to terms of men, we find that seven gross tons is required for each man, and this figure will include the necessary animals, guns, vehicles, and supplies for two months. This is based on the use of vessels larger than 3000 gross tons, which is the smallest size considered suitable for a transport, and it should be noted that the British are using their very largest ships for this purpose in the present war, even in the short cross-channel traffic. This means 700,000 gross tons. To this must be added 15 per cent, say 100,000 tons, in order to preserve the integrity of units. It is most important, when disembarking, that each ship carry a complete unit. This makes a total of 800,000 gross tons for the troops.

⁵ Gross tonnage must not be confounded with displacement. It is determined by dividing the entire internal volume of the hull expressed in cubic feet, by 100. The cargo capacity, or net tonnage, is the volume of cargo space expressed in cubic feet, divided by 40, and, as shown, it is usually greater than the gross tonnage.

⁶ The figures on our merchant marine given in this article are from a carefully compiled list, corrected to December, 1916.

We have also seen that to maintain a force in land operations requires a daily supply of at least 30 pounds per man; therefore to keep this army, together with the bases en route (Honolulu, Guam, and the advanced base), will require about 70,000 tons per month, allowing for the time required for the round trip from home ports, and this means a gross tonnage of about 180,000. However the force is supplied for two months, so not more than a third of that 180,000 will be needed before the return of the empty transports will give plenty of shipping to choose from, so we can estimate that the army needs 860,000 gross tons of shipping, no vessel to be smaller than 3000 tons.

However this does not cover our full needs in shipping. In addition the navy will require more scouts. Our scouting force is very weak, and when the long line of communications from this country to the Orient is considered, the need for fast scouts is evident, it would be impossible to have too many. Furthermore, district scouts are necessary, smaller ships to patrol the waters round our coasts and in the vicinity of the bases. Naval mine planters and submarine tenders constitute another need which must be met; also cable and hospital ships for both services and other miscellaneous ships. Harbor patrol vessels, army mine planters, etc., need not be considered because they can be taken from vessels smaller than 3000 tons, and therefore will not interfere with deep sea requirements.

These items cannot well be calculated. All we can do is to bear in mind that they must be supplied, and compare our merchant marine with the requirements that we have reduced to figures.

Use	Required gross tons	Available shipping gross tons
Scouts and Train	227,325	227,325
Colliers	670,000	844,743
Oil tankers	137,000	584,807
Transports, and A. & N. supplies	910,000	512,944
Total	1,944,325	2,169,819

The entire ocean merchant marine of the United States (December, 1916) is included under the heading "Available Shipping," except that vessels under 3000 tons are not included on the transport line, while colliers and oil tankers are carried down to 2000 tons.

This table shows that our merchant marine is able to supply vessels suitable for colliers with a surplus of 175,000 tons. There is a large excess of tankers, but such a vessel unfortunately cannot be used for any other purpose, so this excess cannot be employed to cut down the large deficiency that exists in the transports. Assuming that the excess in colliers, 175,000 tons, can be employed as transports and supply vessels, the net deficiency in that class is 212,000 tons, and it must be remembered that the miscellaneous requisites of extra fleet scouts, district scouts, etc., are not yet provided.

It will also be noted that no surplus has been allowed to replace the losses which will inevitably occur by stress of weather and by hostile operations; neither is there any excess to permit of the periodical repair and overhauling which all vessels need.

Then too we may well give thought to the economic condition of the country if its entire merchant marine were suddenly diverted to the use of the army and navy.

There is no exaggeration in these figures. Every effort has been made to keep them down to the lowest terms consistent with the assumptions, and the experience of Great Britain in the present war gives point thereto. In 1914, her merchant marine totalled a little over twenty million tons, and, according to recent accounts, which are probably fairly accurate, about eight million tons is being used for strictly military purposes, and this huge amount is needed notwithstanding the fact that the grand fleet is operating from home bases, and that the bulk of England's army is just across the Channel, only 20 miles wide, while we have been calculating on an offensive 7000 miles from our home ports.

So far as the logistics of our fleet and of an overseas expedition are concerned, the lessons I derive from this study are, (1) the necessity for improving and fortifying bases in all probable theatres of operations, and (2) the great importance of developing our merchant marine.

We will refer to the example of England, a country which for three hundred years has been supreme at sea. Her naval history is an almost unbroken record of success. She has a chain of bases round the world in almost every conceivable direction. There is no part of the globe that does not possess a British naval base; and 46 per cent of the world's merchant marine is under her flag. While it would be rash to draw the conclusion that her naval success is due to these two facts, we can at least feel sure that they made that success possible.

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THE NAVY AND FILIBUSTERING IN THE FIFTIES

(CONTINUED)

By LOUIS N. FEIPEL

II. LOPEZ' SECOND EXPEDITION AGAINST CUBA

Lopez, undaunted by this first mishap, travelled through the southern and southwestern states, secretly enlisting men and making provision for another expedition to Cuba. In April, 1850, the first detachment under Colonel Theodore O'Hara succeeded in sailing from New Orleans, on board the sailing vessel *Georgiana*.¹

The *Susan Loud* (also a sailing vessel), carrying a second detachment, sailed from New Orleans early in May. Both vessels were joined at the island of Contoy, off the coast of Yucatan, by Lopez with 450 followers, on board the steamer *Creole*. The whole command then sailed away for the shores of Cuba.

Representations to this effect having been made to our government by the Spanish minister at Washington, the Secretary of the Navy issued the following orders to Commodore Parker, commanding the Home Squadron, who was then in Washington:

[Confidential.]

NAVY DEPARTMENT, May 15, 1850.

SIR: Though the government has no precise information, yet it has been informed from sources entitled to great respect and consideration, that a military organization has been effected in the interior of the United States, formidable both in numbers and from the character of those engaged in it, for the purpose of attacking the island of Cuba, and of revolutionizing the government. This force is represented to consist of between 6000 and 10,000 troops, of the best kind and material to

¹ The *Georgiana* seems to have been suspected by the United States revenue cutter which was cruising in the offing, but the government vessel contented itself with sailing around the bark two or three times, and then went away.—Caldwell, "Lopez Expeditions," p. 59.

render the assault formidable, and, as it is believed, is sufficient, with other means and resources at command, to emancipate Cuba from Spanish rule. Large numbers of those engaged in the enterprise departed, as it is alleged, from the city of New Orleans, accompanied by Generals Lopez, Gonzales, and others. It is represented that they expect to effect a landing upon the island about this time. All accounts concur in representing that it is a military expedition or enterprise begun and set on foot within the territory or jurisdiction of the United States, to be carried on from thence against the island of Cuba and the government of Spain.

Any such invasion of that island is in violation of our obligations of neutrality to the government of Spain.

The government of the United States is bound to respect the rights of the inhabitants of Cuba and of the government of Spain, and "no person is permitted, within the territory or jurisdiction of the United States, to begin or set on foot, or provide or prepare the means for, any military expedition or enterprise to be carried on from thence against the territory of any foreign prince or state, or of any colony, district, or people."

You are therefore directed by the President of the United States to despatch forthwith such of the vessels of the Home Squadron under your command, as may be within your reach, to the port of Havana, in the island of Cuba, where they will vigilantly and actively, in co-operation with Captain Tattnell, of the steamer *Saranac*, observe the movements and operations of all vessels approaching the harbor of Havana or the island of Cuba, for the purpose of ascertaining whether any military expedition or enterprise has been begun or set on foot, or any means provided, to be carried on from the United States against the territory or domains of Spain.

Should they ascertain that such hostile movement is on foot and is proceeding against the island of Cuba, they will use all proper means in their power to prevent a landing or the carrying out such expedition or enterprise, so as to avert and prevent the violation of our obligations of amity and peace with Spain.

Should the expedition from the United States have effected a landing, and a revolution be in progress, they will prevent the landing of any reinforcement or of any arms or provisions under the American flag.

To the citizens of the United States who may be there in the prosecution of their peaceful and lawful pursuits, and who may apprehend danger either to their person or property, they will extend the protection and aid to which they are entitled as American citizens.

Should they, upon their arrival at Havana, ascertain satisfactorily that no such expedition is on foot, they will return to the Atlantic States to prosecute the future orders of the Commander-in-Chief of the Squadron, in the mean time keeping the Department fully informed of all occurrences in connection with duty assigned to them.

I am very respectfully,

Your ob't servant,

COM. F. A. PARKER,

W. BALLARD PRESTON.

*Com. Home Squadron, Washington.*²

² Senate Exec. Doc. No. 57, 31st Cong., 1st Sess.

Similar orders were sent to Captain Josiah Tattnall, commanding the steam frigate *Saranac*; to Captain Isaac McKeever, of the frigate *Congress*; to Commander V. M. Randolph, of the sloop-of-war *Albany*; to Commander Charles Lowndes, of the sloop-of-war *Germantown*; and to Lieutenant James H. Ward, commanding the steamer *Vixen*.

Some 19 armed vessels of the Spanish Navy were at that time coasting around various parts of Cuba to intercept the reported expedition. These vessels, according to the report of Consul Campbell, at Havana, were regarded as lacking in efficiency, and incapable of preventing the invaders, if coming in steamers, from effecting a landing.

As we have seen, the expedition had already departed from the United States. The three vessels had on board 650 men, with arms and ammunition. After getting to sea, the vessels proceeded to the island of Contoy, off the coast of Yucatan, after which the expedition was headed for Cardenas, on the coast of Cuba. The *Creole* reached Cardenas at 3 o'clock on the morning of the 19th of May, landed and took possession of the town, and burned the governor's palace, taking him prisoner after a battle in which 50 of the Spanish troops and 30 of the invaders were killed. The expedition then re-embarked and made for Key West, closely pursued by the Spanish armed steamer *Pizarro*. The *Pizarro* had a few days previously captured the two sailing vessels of the expedition off Contoy.

On the 21st of May, as the United States schooner *Petrel*, Lieutenant John Rodgers, commanding, was engaged in surveying duty, and standing across the Florida Reef, near the West Sambo, off Key West, she discovered the *Pizarro* with a signal flying for a pilot, while the *Creole* was in the distance hull down inside the reef. As there was no pilot-boat in sight, Rodgers determined to send his own pilot on board the *Pizarro* to bring her into Key West. When the *Pizarro* came near, the *Petrel* hove to, and an officer from the Spanish man-of-war came alongside and informed Rodgers that the other steamer (the *Creole*) was a pirate, and that General Armero, who commanded the *Pizarro*, wanted a pilot, in order to take the said pirate. Rodgers at once surmised that the *Creole* was part of the frustrated filibustering expedition. But it was by no means clear to him that it was any part of his duty to furnish a pilot to enable a foreign man-of-war to take American

citizens, in American waters and under the American flag, running into one of our own ports. He even decided that if an opportunity arose, it would rather be his duty to interpose the sides of the *Petrel* to the Spaniard's fire, and take possession himself of the American steamer, to be delivered over for legal action to the authorities having jurisdiction in the waters where she was found.

Rodgers sent a pilot to bring the *Pizarro* into Key West, directing the pilot, however, on account of the quarantine regulations, not to go on board, but to pilot the *Pizarro* from one of the *Petrel's* boats (as was the custom in foreign ports), and to take her nowhere except into Key West. The pilot could not understand Spanish, nor the Spaniards, English. The pilot told them to steer northwest, and they kept the *Pizarro* northeast, and were soon running on a shoal with nine feet of water on it. The pilot and the Spanish captain both became flurried, and finally the pilot-boat was cast off and returned to the *Petrel*. At this juncture, Rodgers himself went on board the *Pizarro* and offered to pilot her into Key West. The offer was refused, General Armero declaring that by not furnishing him with a pilot, Rodgers had prevented him from taking a pirate—that an officer had, under the Spanish flag, assured Rodgers of the piratical character of the *Creole*.

As Rodgers was departing, the general sent to ask the name of the vessel which he commanded. Rodgers replied to the officer that he had first sent a pilot, and the Spaniards not understanding him, Rodgers had come on board himself to pilot the vessel; that the general, in return, had not been entirely civil, and that he must find out the name of the vessel as best he could. Rodgers gave this message successively to two officers, each of whom apparently hesitated to deliver it; and the general, who had evidently heard the conversation, came himself to where Rodgers stood. With a manner changed decidedly for the better, he then said that he would have to report the facts to the United States Government.³ Rodgers thereupon gave his own name, as also that of the *Petrel*, to the general, in writing.

Meanwhile, the *Creole* ran into Key West, made fast to a wharf, and her people delivered themselves over to the civil authorities.

³ In transmitting these facts to the Navy Department, Rodgers reported "for official discourtesy to me while in the execution of a civility to his flag, the Spanish General of Marine on board the *Pizarro*."

Rodgers proffered the services of the officers and crew of the *Petrel*, numbering 18 men, for whatever aid they could furnish. They were the only force, either military or naval, in the place. On the requisition of the United States marshal, the *Petrel's* men aided him in taking possession of the *Creole*. Also, at the request of the mayor of Key West, Rodgers seized, and received on board the *Petrel* for safekeeping, 401 muskets and 700 sabers. The 600 men on board the *Creole* were assigned quarters in the vacant United States barracks at Key West. General Lopez, the commander of the expedition, was among them. However, he was soon set at liberty, in spite of instructions to the contrary given to the District Attorney of Savannah. Seven negro slaves, who had been brought over in the *Creole*, were temporarily committed to jail by the mayor of Key West, to await the pleasure of the President of the United States in the premises. They were subsequently claimed by the Spanish vice-consul on behalf of their owners—Spanish subjects resident in the island of Cuba—and surrendered to him to be conveyed again to Cuba by the *Pizarro*.

This expedition of 1850, and the attempts of the United States Government to circumvent it, had already been a prolific source of embarrassment to the administration. On May 20, the newspapers had denounced the action taken by the President in sending war vessels to try to prevent the expedition from landing, or at least to cut off supplies and reinforcements coming from the United States. This action was likewise made the ground for a bitter attack in Congress by Senator Yulee, of Florida. Yulee said he was doubtful whether any such expedition were contemplated. If it were, he did not believe it to be clearly illegal under the neutrality act of 1818. He said that the administration showed a desire to usurp powers which the Constitution never gave it. It (the administration) intended to deprive persons of life, liberty, and property, without due process of law. In attempting to keep provisions from reaching the island, the President was himself breaking our laws of neutrality by taking the part, in a foreign territory, of one belligerent against the other. The President had even gone so far as to make war without the authority of Congress. The government seemed to Yulee—as to a very large number of Americans—to be taking the side of despotism against liberal progress. Senator Yulee defended the filibusters, saying that they

were acting under "their personal civil right of emigration and expatriation."⁴

This remarkable speech called forth a masterly reply from Daniel Webster. The senator from Massachusetts reviewed our promises to Spain, which had been repeated through the Executive again and again ever since Jackson's time. We were not only bound by treaties of peace, amity, and good will, but we had repeatedly promised that if Spain would abstain from surrendering Cuba to any other European power, she might be assured of the good offices of the United States to maintain her in possession of the island. Webster held it to be an unquestionable law that American jurisdiction followed the flag, whether that flag floated on the sea, or even in a foreign port. This jurisdiction imposed the duty of protection, not only for the benefit of the United States, but also, in true justice, for the benefit of a foreign country whose peace was threatened. Furthermore, the act of 1818 imposed it as a solemn duty on the President to preserve the peace of the country by suppressing every unauthorized expedition set on foot in the United States against any portion of a country with which we were at peace. Mr. Webster could not regard the clause in the Constitution which safeguarded life, liberty, and property as applying to armed insurrection. He expressed, moreover, the highest confidence in the President of the United States.⁵

The administration had also to deal with a very delicate and important problem growing out of the Cardenas expedition. It will be recalled that the two sailing vessels of the expedition (the *Georgiana* and the *Susan Loud*) had been seized by the Spanish naval forces, on May 18, off the island of Contoy. The 52 men on board these two vessels were taken to Havana for trial, the vessels following with prize crews. But Contoy, lying near the coast of Yucatan, was plainly within the jurisdiction of the republic of Mexico, and therefore the prisoners were not properly amenable to Spanish justice. Many of them, moreover, were doubtless American citizens. The President of the United States, therefore, fearing that the Spanish authorities in Cuba, in their

⁴ This view would have justified President Taylor's unfortunate threat, made in his proclamation of 1849, to refuse protection to filibusters as American citizens; and these views also tied the hands of the government when Crittenden and his men were captured in 1851, and later proved embarrassing in the famous case of the *Virginian*. (Caldwell, "Lopez Expeditions," p. 75.)

⁵ Cong. Globe, May 21, 1850, Vol. XXI, pp. 1030-5.

excessive zeal to punish the invaders of that island, and all connected with them, while flushed with victory might possibly forget the difference between crime and the intention to commit crime, and thus wreak their vengeance on innocent American citizens, resolved that the American eagle must and should protect them against any punishment except such as the tribunals of their own nation might award. Our consul at Havana was accordingly instructed as follows:

Tell the Count of Alcoy⁶ to send them home to encounter a punishment which, if they are honorable men, will be worse than any he could inflict, in the indignant frowns and denunciations of good men in their own country, for an attempt to violate the faith and honor of a nation which holds its character for integrity of more value and higher worth than all the Antilles together. But warn him in the most friendly manner, and in the true spirit of our ancient treaty, that if he unjustly sheds one drop of American blood at this exciting period, it may cost the two countries a sanguinary war.⁷

And to support this declaration, our consul was instructed to call upon the frigates *Congress* and *Saranac*, and the sloops-of-war *Albany* and *Germantown*, which had been ordered to those waters.⁸

The commanders of the American war vessels had received instructions which compelled them to resist all attempts on the part of the Spanish men-of-war to capture the filibuster ships. Captain Tattnall, in the *Saranac*, as we have seen, had been placed in command of all the American war vessels in those waters; and the administration, apprehending the probable capture of some of the filibuster ships by the Spaniards, and their forcible recapture by the American warships, had instructed Captain Tattnall to act according to circumstances.

On the 24th of May, Consul Campbell addressed a communication to the Captain General of Cuba, requesting that the two captured vessels, together with the persons who had been found on board, be immediately given up, in order that they might be sent to the United States for trial, and the legality of their capture and detention be left to the governments of the United States and

⁶ Roncali, Count of Alcoy, was at that time Governor General of Cuba.

⁷ Senate Exec. Doc. No. 57, 31st Cong., 1st Sess.

⁸ The information received by the Executive Department relative to the above revolutionary movements in Cuba, and the armed expeditions from the United States connected therewith, was called for by the Senate of the United States on May 23, 1850, duly transmitted, and printed as Senate Executive Document No. 57, 31st Cong., 1st Sess.

Spain to be decided upon. The consul's letter was written in the morning, and was about to be sent, when Commander Randolph arrived at Havana in the *Albany*. An interview was at once arranged between Commander Randolph, the consul, and the captain general; and in the hope that this interview would end in the delivery of the ships and prisoners, the consul did not send the letter, but placed it in his pocket, to be delivered in the event of his and Randolph's requests being refused.

At the interview which followed, Commander Randolph told the captain general that he had understood that two vessels, reported to be American, had been captured by the general of marine, together with about 100 men, of whom some 14 had been brought to Havana. The captain general replied that two vessels, with some men, had been captured, and that the Cuban Government had in their possession proofs that those vessels and men were connected with the expedition which left New Orleans for the invasion of Cuba. Commander Randolph then desired to know whether the captured vessels had the American colors flying; whether they were on neutral ground, or on the high seas, or in Spanish waters; whether the men captured were Americans in whole or in part; and whether any overt act had been committed by them upon Spanish territory. The captain general replied that owing to the general of marine's short stay in the port of Havana, he had not received official information of the circumstances connected with the capture to enable him to give answers to the questions propounded to him, but observed that pirates could be captured wherever found, whatever flag or papers they might have.

Commander Randolph thereupon said to the captain general that vessels under American colors could not be stopped on the high seas by a foreign force unless suspicions were entertained of their being engaged in piracy; and then if proper papers were found on board, the vessels and men had to be delivered up to the authorities of the United States. In consequence of this, he accordingly demanded the delivery to him of the two vessels and the men captured by the general of marine, that they might be carried to the United States for trial, which the captain general refused to accede to, saying that he had no jurisdiction over the matter, it being a case which was to be tried by the marine court, over which he had no jurisdiction.

Upon being asked by Randolph for permission to see the prisoners then in the port of Havana, the captain general answered

that he had no authority; that the general of marine, being the judge of the cause, would, if he could, let Randolph see the prisoners. Randolph, thereupon, asked the captain general if he was not the head and chief of the Cuban Government. He answered, yes. He was then told that he was the source from which information ought to be secured, and not from his subordinates.

Commander Randolph and the consul explained to the captain general their views in regard to the policy theretofore pursued by the United States in relation to the right of visit and search, and expressed their opinion that the affair they had been referring to was more serious than his excellency thought, for it might involve the question of war. His excellency, however, thought differently, and said he was personally willing to give all satisfaction, but that he could not give way to threats; and if war was the consequence, he was prepared to meet it, using the expression, *que vengan* (let it come). Commander Randolph and the consul hastened to disclaim any intention of making threats. At the same time, Randolph informed the captain general that inasmuch as he had not been able to obtain any satisfactory information, and was not permitted to see and converse with the prisoners, he would report to his government that two American vessels and several American citizens had been captured on the high seas, or on neutral ground, and brought to Havana as prisoners; and that, in consequence, war virtually existed between the United States and Spain. The captain general replied that Randolph might do as he pleased, but the report would not be correct, for the captured vessels and men formed part of the expedition under Lopez were nothing but pirates, and therefore subject to the law of nations enforced by the power to which the cruiser that captured them belonged.

Thereupon Commander Randolph observed that he would perhaps think proper to address his excellency a note on the subject, and wished to know if it would be received. The captain general answered that if Randolph's letter was in proper terms, it would be received, a copy thereof sent to the general of marine to obtain information, and when that was received, he (the captain general) would be glad to answer Randolph's communciation; also, that he would forward to the Spanish minister at Washington a copy of the correspondence, as it was a subject which had to be arranged by the representatives of the two governments, who alone had diplomatic power.

In the course of the conversation, Mr. Campbell took out and presented to the captain general the letter which he had previously prepared, which his excellency, upon learning the contents, refused to receive, asserting that the consul had merely commercial functions, and therefore had no right to interfere in the matter, observing also that neither he himself, nor the consul, nor Commander Randolph had any diplomatic powers. He moreover tried to persuade Randolph not to do anything more in the business, since he had already done everything which his duty as an officer of the United States required of him, more particularly so as it was in favor of men undeserving of his sympathy, who the year before had abused him for the affair at Round Island.

Immediately after this interview, Commander Randolph and the consul waited upon the general of marine. From him they learned that he had captured the two vessels and some men; that the vessels had no colors flying, and that the men on board (some 60 or 70) were partly Americans; that the vessels and men were on neutral ground, but that, having proofs in his possession that they formed a part of the expedition which had tried to invade his country, he had gone and captured them as pirates; and that some of the men were then in the port of Havana.

The general was asked by Randolph what evidence he had that the vessels and men formed a part of the expedition. The answer was that he had reliable information, corroborated by papers found with the ships, and the men's own confessions. Asked whether force or threats had been used to obtain those confessions, he replied that that was a question which he could not accept. To the question whether the vessels and men had any papers, and avowed themselves to be Americans, the general replied that they had not avowed anything; that when his steamer was seen by them to be approaching, they understood their position and said nothing; that he had not examined the papers; that his stay there was very short, merely long enough to put the captured vessels and men in charge of a sailing vessel of war to bring them into Havana; and that he picked out, and brought in the steamer *Pizarro*, such as he considered leaders.

Commander Randolph then said to the general of marine that he had been informed that two American vessels, having American flags and papers, had been captured, with a number of men on the high seas and beyond Spanish jurisdiction; and he therefore demanded the immediate delivery of the captured vessels and

men to him, in order that he might take them to the United States for trial by his government. The general answered that he had no authority; that the vessels and men had been captured as pirates; that he had proofs of it, and that the laws of Cuba would try them. Randolph then requested permission to see and converse with the prisoners who were in Havana, so as to obtain a fair statement, which request was refused. Randolph then demanded it as a right. The general refused again, observing that as the two captured vessels and the greater part of the men had not yet arrived in port, no declarations had been taken from them; that the summarial proceedings were not finished, and therefore the laws of the country did not permit the prisoners to hold communication with anyone but the court that was to try them; but that after that they would be allowed counsel and all facilities for making their defence. The general also contradicted the rumor that confessions had been extracted from the men by putting the rope to their necks, and added that no judicial investigation had yet been begun, but that the men in conversation had acknowledged that they formed a part of the expedition which, under the command of Lopez, was to have invaded the island. In the end, he admitted also that the captured vessels were American, and the men in part Americans.

Thereupon Commander Randolph and the consul observed to the general that it would be better for him to deliver up the vessels and men; that the laws of nations were plain; that the capturing of the vessels and men on neutral ground was illegal. The case of the Duke d'Enghien, under the empire, was cited by them as a parallel, in order to bring to the general's mind the intense excitement produced in Europe and the world by that outrage. The general asseverated that the cases were not parallel, and that the duke was a gentleman. Campbell observed that the Duke d'Enghien had nothing to lose but his life and his soul (if he was not prepared for death), and the Contoy prisoners were in the same position. Randolph said the only difference was that the duke belonged to the blood-royal, and that these men were obscure citizens. But the general still thought as before, and appeared greatly astonished that the American officers should want to consider the two cases as parallel.

The result of the interview was that the general of marine refused to deliver up the vessels and men, and denied permission to Commander Randolph to communicate with the prisoners then

in Havana. He observed, however, that if Randolph would remain some days longer in port, he and the consul could then have the opportunity to learn the result of the trial and to communicate with the prisoners. But Randolph proceeded to sea at once, determined, if possible, to intercept and retake both the vessels and the prisoners, should they be alone or under convoy of Spanish men-of-war. This the consul and he had agreed he had a right to do under the law of nations, in conformity with the policy of the United States, as set forth by Daniel Webster in the Ashburton correspondence, and under the act of Congress authorizing our men-of-war to capture any vessel which should unnecessarily detain an American merchant ship in the Gulf of Mexico. They believed that these ships were being unnecessarily detained after having been demanded to be sent home for trial and the demand having been refused.

The *Germantown* joined the *Albany* on the following morning. A Spanish frigate kept near the two American war vessels continually. Altogether, the Spanish Government had about 21 war-ships on the station at that time. On the 25th of May, the *Saranac*, Captain Tattnall, arrived at Havana. Just before his arrival, Tattnall had fallen in with the *Albany*, and had been informed of Randolph's intention. While appreciating the motives and spirited conduct of Randolph, Captain Tattnall deemed it best, under the circumstances, to adopt a different course.

As soon as the *Saranac* came to anchor, Tattnall waited upon the captain general, and informed him that while it was not his desire or purpose to seek a meeting with the Spanish frigates, nevertheless, if he did fall in with them at sea, while they were in the act of convoying the two American vessels, he would certainly attempt the recapture of the ships. So impressed was the captain general with Tattnall's determination, that he immediately gave orders that the captured vessels should not depart from the port in which they then were. Thus was prevented the risk of a collision which might have caused a rupture between the two governments.

Captain Tattnall's conduct was fully approved by the administration at Washington. It is said that his letter, acquainting the Navy Department with his action and the reasons upon which it was based, was handsomely complimented at a Cabinet meeting where it was read, and pronounced a model report. His

reasoning was as follows: The two American vessels, detected in flagrant violation of international law and the President's proclamation, had been captured, were already in a Spanish port, and could not there be molested by United States war vessels. Should they be brought out of the port, however, and be found upon the high seas under convoy of the Spanish frigate which had been ordered to bring them to Havana, Tattnell intended to recapture them. This placed the matter of peace or war practically within the determination of the Cuban captain general. If the *status quo* remained unchanged, the capture of the vessels claiming the protection of the United States would then form the subject of negotiation between the two governments.

On May 30, Captain Tattnell, in company with consul, Judge Marvin, and Collector Douglass, of Key West, called on the captain general and said that he was about to return to the United States, and should be highly gratified to be able to communicate to his government that he had been permitted to see and converse with the Contoy prisoners, as, under existing circumstances, it might do much good and tend to allay any excitement that might exist at home. The captain general replied that personally he had no objection to permit the prisoners to be seen and conversed with, but the law would not permit it; that the prisoners were being treated well, and there was nothing of which they could complain, unless it was their not being permitted to go into the streets; and that the marine court before which their trial was pending consisted of calm and intelligent officers, who would dispassionately weigh the testimony and do full justice. The American officers did not attempt to controvert these statements, and left. Consul Campbell then reported the result of the several interviews to the Secretary of State, and concluded by saying: "Your consul, your naval officers, can do nothing for the relief of the parties; and it is left for the President to adopt such measures as his well-known firmness, patriotism, and devotion to the honor and interest of his country may dictate."

President Taylor accordingly deemed it proper to transfer the duties in regard to the Contoy prisoners to Commodore Charles Morris, of the navy. This officer was made the bearer of a special message from the President to the Governor and Captain General of Cuba. His instructions from Secretary of State Clayton read as follows:

DEPARTMENT OF STATE, WASHINGTON, June 29, 1850.

SIR: The President directs that you proceed, as soon as possible, to Havana, in the war-steamer *Vixen*; that on your arrival there you request an audience of the Governor and Captain General of Cuba, representing to him that you bear a message to him from the President of the United States, of importance to his country as well as your own. On being admitted to his presence, you will demand of him the immediate release of all the prisoners taken at Contoy and without the Spanish jurisdiction. When making this demand in the name and by the authority of the President of the United States, you will repeat to the Governor and Captain General of Cuba the assurance heretofore conveyed to him and his government, that the government of the United States has never ceased to perform every duty enjoined upon it by our treaty with Spain, and that it will faithfully continue in the discharge of those duties so long as the peaceful relations of the two countries shall continue. That the President expects, in return for this friendly disposition and conduct, the strictest observance of the rights of the United States and their citizens from Spain; that he recognizes no right on the part of the Spanish authorities to try and punish the prisoners taken at Contoy; and that he will view their punishment by the authorities of Cuba as an *outrage* upon the rights of this country. Without enlarging upon the grounds taken in making the demand through the consul, of which you are fully informed, the President is satisfied, from the reports which he has received of the evidence taken before Judge Marvin, at Key West, as well as from other information which he deems entirely reliable, that the men taken at Contoy had embarked to go to Chagres, and if any of them had ever designed to invade Cuba, they had repented of that design, and abandoned it. Under these circumstances, the President cannot consent that the lives or liberties of citizens of the United States shall be forfeited, or that the question of the truth of the evidence above mentioned shall be referred to any foreign tribunal.

You will say to the Governor that your mission has been occasioned by intelligence that the demand heretofore made by the consul, Mr. Campbell, in regard to these prisoners, was refused on the ground, among others, that the consul had no diplomatic powers. In reply to the demand made by Mr. Campbell, we learn that he was referred to the Spanish minister in Washington, Don A. Calderon de la Barca, and to the court of Madrid. The views of this government on the whole subject have been fully made known to the Spanish minister residing at Washington, of which he has doubtless fully advised the government at Madrid and the Captain General of Cuba. This government has no reason to suppose that a demand so just and reasonable would not now be acceded to by that minister, who is no less distinguished among us for his humanity than his justice, and who, while zealously on all occasions maintaining and defending the rights of Spain, has never shown himself insensible to the importance of preserving the amicable relations which have so long existed between our respective countries.

As to the reference made by the Governor and Captain General to the court of Madrid, you will say to that distinguished functionary that, in the judgment of the President of the United States, were he to abandon these prisoners to the consequences of the confinement which they must undergo in prison, in such a climate as that of Havana at this season of the year, until a demand could be made upon the court of Madrid and an answer returned, it would amount to a probable sacrifice of the lives of many of them, and a desertion of the duty of this government to protect its own citizens.

The owners of the bark *Georgiana* and the brig *Susan Loud* have exhibited to this department statements to prove the innocence of the captains who chartered those vessels; and you will inform the Governor and Captain General of Cuba that this government expects those vessels to be returned to their owners, with damages for their capture and detention. Those statements confirm the testimony taken before Judge Marvin of the innocence of the prisoners of any intention to invade Cuba; which testimony has, we learn, been fully communicated to the Governor and Captain General.

Should the Captain General refuse to release the prisoners upon your demand, you will then inquire fully into the manner in which they have been treated; their present and past condition; whether any have died, or are sick, and what attention has been paid to them; and what is that evidence upon which the Spanish authorities rely to establish their guilt. For this purpose you will demand admittance to all the prisoners in the presence of the American consul, and upon your return you will make a full report on all these subjects.

You will also respectfully request of the Captain General all the testimony which he has obtained, to enable this government to prosecute any person or persons in the United States who have been engaged either in invading Cuba or in getting up an expedition for that purpose; and you will say to him that I am encouraged to make this request by Don A. Calderon de la Barca, who assures me that some such testimony is in possession of the Spanish authorities and will be cheerfully tendered to this government to enable it to maintain its treaty stipulations with Spain.

I am, sir, very respectfully, your obedient servant,

JOHN M. CLAYTON.

COMMODORE CHARLES MORRIS, &c., &c., &c.⁹

Meantime, on June 30, Mr. Campbell, together with Commodore McKeever, several officers of the *Congress*, and Commander Lowndes, of the *Germantown*, again waited upon the captain general. The captain general was, as always, polite and courteous. He spoke of the Contoy prisoners, and said, "*Viven y viviran*" (they live, and will live), from which it was inferred that no capital punishment was contemplated. The captain general also

⁹ House Exec. Doc. No. 83, 32nd Cong., 1st Sess., pp. 5-7; House Exec. Doc. No. 86, 33d Cong., 1st Sess., pp. 353-4.

expressed the opinion that the summarial proceedings would be concluded in a few days; that some of the prisoners were in truth passengers for California; but that the masters of the vessels were cognizant of the expedition, and had knowingly taken on board men, arms, and munitions of war.

On the 1st of July, Commodore Morris embarked in the *Vixen*, and arrived at Havana on the 10th. He immediately addressed a note to the captain general, requesting an audience, and received an oral message that he would be received the next day at noon. There were at that time in the harbor of Havana, in addition to the *Vixen*, the frigate *Congress* and the sloop-of-war *Albany*. From Commodore McKeever, commanding the *Congress*, Morris learned that he had held several conversations with the captain general respecting the Contoy prisoners, and had been assured by him that a part of them would be released before the 12th of the month. McKeever had intended sailing for Rio de Janeiro on the 7th, but had agreed to postpone his departure for four days upon receiving the above assurance. Early in the morning of the 11th, he received a note from the captain general, dated the 10th, informing him that 42 of the prisoners had been liberated, and would be sent to any vessel that he might designate. McKeever was accordingly instructed by Morris to receive them on board the *Congress*.¹⁰

At noon of the same day, Commodore Morris waited upon the captain general. When the main object of his visit, and the authority under which he was acting, were stated, the captain general declined to receive any communication as coming officially from the government of the United States, because Morris had no authority to act in any manner upon diplomatic subjects. At the same time, he expressed his readiness to receive any communication Commodore Morris might make in his official capacity as an officer of the navy, and to give to it the same consideration as though it had emanated from a higher authority. In reply, he

¹⁰ This was a notable diplomatic victory for Secretary of State Clayton. It is interesting to note, in this connection, that the Captain General of Cuba, in a letter dated July 9, 1850, complained bitterly to his home government of what he deemed the deliberate effort of Clayton to bring on a war between the United States and Spain. (Caldwell, "Lopez Expeditions," p. 80.) Torrente, also ("Bosquejo Economico Politico de la Isla de Cuba," Vol. I, p. 49), believes that war with Spain would have resulted if Clayton had remained Secretary of State.

was told that Morris could act only in conformity with his instructions, and that any communications which he might make would have to be made as under the authority and by direction of the President of the United States. The consideration and weight which the captain general might give to these communications would, of course, depend upon his own views of his duty.

In the course of the conversation which followed, all the communications required by Morris' instructions were made to the captain general, with the exception of a formal demand for the captured persons who were still detained. Morris was induced to defer this until he could communicate with those who had been released. The captain general stated that the persons who were still detained were beyond his lawful control until the judicial proceedings upon them (which were still in progress) should be completed.

On the morning of the 12th, Consul Campbell went with Commodore Morris to the *Albany*, where they saw and conversed with the 42 persons who had been liberated the day before.¹¹

From the statements of these persons it appeared that from the time of their capture almost up to the time of their release they had been more or less confined by leg-shackles, and generally on the lower gun-deck of the Spanish ship-of-the-line *Soberano*. In other respects none of them made any complaint of gross ill-treatment. None of the original number had died, and all were then present. When any had been sick, they had been sent to the hospital until they were well enough to return to the ship. All of them appeared to be in good health, excepting one who had returned from the hospital the day they were liberated.

The *Albany* sailed for Pensacola, with these men, on the morning of the 13th, with orders to hold them on board until Commander Randolph should receive directions relative to them from the administration at Washington. Upon the arrival of the *Albany* at Pensacola, Randolph was instructed by Commodore Newton to proceed to Mobile and to deliver the men over to the United States Marshal for the southern district of Alabama. After performing this duty, Randolph returned to Pensacola.

On the 15th, Commodore Morris had another interview with the captain general, at which he made the formal demand for

¹¹ The men had been transferred from the *Congress* to the *Albany* for transportation to the United States.

the ten prisoners who were still detained. The captain general, in reply, stated that these persons were then in the possession and under the control of the judicial tribunals, and that until those tribunals should decide on the guilt or innocence of the men, he could not lawfully interfere with them. He stated also that the master of the *Georgiana*, the mate of that vessel, and the mate of the *Susan Loud* were all that were on trial, and that the seamen were detained only as witnesses. He concluded by repeating assurances of his great respect for the President of the United States, and of his own desire to preserve friendly relations between Spain and the United States by all means that were consistent with his duties toward his own country.

By an arrangement with the general of marine, Commodore Morris and Consul Campbell visited, on the morning of the 16th, all the persons who were still detained. The two officers were told that the master of the *Georgiana* (Mr. Benson) had been sent to the hospital about the 14th of the month, in consequence of having shown symptoms of insanity. They found him there, suffering from mania of a violent character. Although he recognized the consul and a Spanish officer, he was evidently unable to comprehend and did not notice anything that was said to him. His mind appeared to dwell upon Lopez, whom he thought to be in the company of his visitors, and on whom he was frequently calling. The chief of the hospital promised to have him placed in the ward for the insane, and that every attention would be given to alleviate his condition. The two mates and the seamen, except one at the hospital, were on board the *Soberano*. On being questioned as to the treatment they had received, they said that they had no complaint to make; that when any of them had been sick, they had been sent to the hospital; and that none of them had died.

The permission to visit the master and the mates had been granted to the commodore and the consul as a special favor; for, by the Spanish laws, the prisoners were not allowed, at that stage of their trial, to communicate with any but the officers of the law. The American officers were therefore requested not to question the prisoners on the subject of their capture and trial, but every liberty was granted to question them about their condition and treatment. Commodore Morris was also authorized to inform the seamen that they were merely being held as witnesses, and that they would be released as soon as their testimony should be closed.

From the "dictamen" of the Auditor of War and Navy, which decided the case of the two captured vessels and the passengers taken with them, it was plain that the authorities of Cuba considered the capture of those vessels as authorized by the law of nations and were regulating all their proceedings accordingly. On being questioned by Morris, the Fiscal of Marine said that the evidence to be used at the pending trials would be the testimony of the seamen, the declarations of the parties, and the papers found in the vessels. Morris was also assured that the trials would be closed without other delay than was due to their great importance. Morris, believing that his longer stay at Havana could not be productive of any advantage, embarked and sailed in the *Vixen* on the afternoon of the 16th of July.

Eventually, all but three of the prisoners were found guilty by the Cuban maritime court. The master of the *Georgiana* and the mates of the two vessels were sentenced to long terms of penal servitude. The condemned men had already started for their destination, when the Queen of Spain, in October, 1850, desiring to give a new proof of friendship to the United States and of especial deference to our new Secretary of State, Daniel Webster, was pleased to exempt the master of the *Georgiana* from all personal punishment, and also extended her royal clemency to the other men. The Spanish Government accordingly took proper measures to set them at liberty the moment they reached Spain.

It seemed to be the policy of Webster to try to conciliate Spain, and the two sailing vessels were allowed to be confiscated by a Spanish prize court, although it was in time of peace, without any serious protest from the United States Government.¹²

Lopez made still another filibustering attempt in the summer of 1851. On the 11th of August, he landed with 480 men on the northern coast of Cuba, where he left Colonel Crittenden and 100 men, and started to the interior, expecting to be joined by the

¹² In compliance with a resolution of the House of Representatives, dated December 15, 1851, President Fillmore transmitted to that body information respecting the seizure and confiscation of the *Georgiana* and *Susan Loud*. The documents were printed as House Executive Document No. 83, 32d Cong., 1st Sess. In further compliance with a resolution of the House, dated March 10, 1854, President Pierce transmitted additional information in this connection. These documents were printed as House Executive Document No. 86, 33d Cong., 1st Sess.

people. He was again disappointed. His army was attacked and dispersed. Crittenden and his party were captured and shot. Lopez and six of his companions were also captured, and afterwards executed at Havana. Of 226 prisoners who remained alive, 135 were sent to Spain under sentence of hard labor. Those who were left in Havana were released through the action of Commodore Foxhall A. Parker, who had been named by the President a special commissioner under the State Department to confer with the captain general of Cuba in the matter. Those who had been sent to Spain were also subsequently released at the earnest solicitation of the American minister at Madrid.¹³

France and England now issued orders to their naval commanders to prevent by force, if necessary, the landing of adventurers from any nation on the island of Cuba with hostile intent. This action led to a solemn warning in the presidential message of 1851. President Fillmore said in this connection:

The maritime rights of the United States are founded on a firm, secure, and well-defined basis; they stand upon the ground of national independence and public law, and will be maintained in all their full and just extent. . . . No American ship can be allowed to be visited or searched for the purpose of ascertaining the character of individuals on board, nor can there be allowed any watch by the vessels of any foreign nation over American vessels on the coasts of the United States or the seas adjacent thereto.¹⁴

The various demonstrations under Lopez, and the general tone of encouragement accorded to those movements by the press and by public opinion, offered flattering inducements for the forwarding of other such enterprises. We find, accordingly, in July, 1853, William Walker organizing a force in San Francisco, for the conquest of the department of Sonora, in northern Mexico. The brig *Arrow*, in which the party were about to embark, was seized by the federal authorities, and the expedition frustrated. Opposition, however, only added to the number of Walker's re-

¹³ Chadwick, *Relations of the United States and Spain (Diplomacy)*, pp. 236-8.

¹⁴ Fillmore, Message, Dec. 2, 1851. The American position was later stated most clearly as follows: "American vessels on the high seas, in time of peace, bearing the American flag, remain under the jurisdiction of the country to which they belong, and therefore any visitation, molestation, or detention of such vessel by force, or by the exhibition of force, on the part of a foreign power, is in derogation of the sovereignty of the United States." (Senate Resolution, June 16, 1858.)

cruits, and on the 15th of October he left San Francisco, in the bark *Caroline*, and landed in La Paz, Lower California.¹⁵

By February, 1854, desertions, wounds, and sickness had reduced Walker's effective force to 130 men. A Mexican brig-of-war blockaded the mouth of the harbor of Ensenada to prevent reinforcements from reaching him and on February 11 the United States sloop-of-war *Portsmouth* arrived in the harbor. The officers of the *Portsmouth* visited Walker at his headquarters. The visit boded no good to the filibuster cause, and Walker hastened his departure, spiking and burying all his guns but one, which he took with him, and leaving behind eight sick and wounded men. These were taken care of by Captain Dornin, of the *Portsmouth*, and carried to San Diego.¹⁶

¹⁵ Wells, *Walker's Expedition*, pp. 23-24.

¹⁶ Scroggs, "Filibusters and Financiers," pp. 43-44.

[TO BE CONTINUED]



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THE EARLIEST EXPONENT OF SEA POWER

By SIDNEY GUNN

It is well known that Admiral Mahan had many predecessors as advocates of sea power, among them men like Lord Bacon, whose distinction was intellectual and in no wise naval, but it is not generally realized that one of the supreme productions of the human intellect is fundamentally a eulogy of the character and the accomplishments of the sailor.

This work is the *Odyssey* of Homer. Scholars have written libraries expounding it. They have disputed whether it is the work of one author or a syndicate; whether it was composed before or after the Greeks acquired the art of writing; whether it is older or later than its companion poem, the *Iliad*; and whether its hero, Odysseus, is a personification of the sun, the summer, or some other feature or aspect of the natural world. About all these things and many more the learned have vigorously and volubly disputed, but, after the manner of their kind, they have for the most part lost sight of the obvious in their enthusiasm for the recondite, and so have failed to make clear to the world the real reason why this work has for thirty centuries held the interest of mankind, and why it is also regarded as among the greatest of the world's literary monuments.

Of course it is true that it is a combination of primitive material. Man in his infancy personified nature and told stories in which the sun and the moon, the seasons, and all the processes of nature were depicted as creatures with the motives and problems of men. This, however, was only during the earliest stages of society, for very soon the savage began to realize that "the proper study of mankind is man," and so he turned to his own history and began to create fables that reflected the growth of that wonderful thing civilization more than they did the natural world. The natural world, however, is the theater of civilization, and there was felt to be a resemblance, if not an identity, between its laws and those

of civilization, so the old heroes who had mainly depicted the sun and moon or the weather were still the characters in his tales, but they had a new meaning, for they represented social forces. It is thus a very reasonable thing to say that Odysseus is a personification of nature in origin, but it is not the complete truth to say that he is that in the *Odyssey*.

At the time that the *Odyssey* was composed, even if we put it before 1000 B. C., the human race had progressed nearly everywhere beyond the point where the natural world was its chief interest; and so the Greek creator of this masterpiece found his inspiration for it in the development of man individually and collectively. Obviously one of the greatest triumphs of human courage and resource over the powers of nature was the ability to navigate the trackless waters without the guidance of landmarks, and it is by making its hero an embodiment of the qualities in our nature that brought about this triumph that the author of the *Odyssey* gives it its unity and its perennial interest.

The creator of this great epic was, in all likelihood, largely unconscious of the fact that he was celebrating the collective efforts of many men and many generations. He probably thought he was recounting the acts of a single individual whom he admired, and the ninety or more generations of mankind who have found the tale of absorbing interest, have done so because it depicts convincingly the experiences of a clearly defined personality. This, however, is the result of the inability of our minds to perceive the general or the abstract except indirectly or by suggestion. Even the great genius cannot think impersonally, because personality is the very basis of human experience; but, by an intuitive process more subtle than thought, he can make personality a symbol of humanity, and those who delight in his work appreciate its implied meaning by the same superconscious faculty as that by which it was created.

The basis of Odysseus's character is delight in adventure and aspiration for knowledge, and these two things are undoubtedly what did most to induce men to venture out on the sea and learn by slow and painful stages to navigate its pathless wastes. It is admitted that the man who invented the hammer or any other elementary tool was a far greater man than the creator of the most complicated modern device, because first steps are always the hardest to take; but what are we to think of the first man or

men who had the hardihood to venture out on the sea in the frail and clumsy craft that primitive implements and elementary knowledge could devise! Surely this was a superlative exhibition of the adventurous spirit, and it is the qualities displayed by these men and their successors down to his own time that the author of the *Odyssey* made the basis of his hero's character.

But it took more than the spirit of adventure and curiosity to conquer the sea. Hardihood and infinite resource were necessary, for the task was such as to put human courage and ability to the supreme test. So Odysseus is the "much-enduring man," and "the man of many devices." Besides his insatiable thirst to know the world and the ways of men, he had courage that nothing could subdue, and resourcefulness that nothing could exhaust. He is, in short, the embodiment of all the striking characteristics of those hardy specimens of our race, whose restless energy and indomitable perseverance have given us the art of navigation and all the benefits derived from it. Not only this, but the picture is made complete by other qualities that distinguish the mariner in all generations. Odysseus shows a facility for getting into trouble and getting out again, and he displays an even more sailor-like attribute in his ability to find a sweetheart in every port.

To be sure, the story has many elements that do not relate entirely to the sea. It has much in it that is the result of its being a combination of myth and legend, and it has a great deal that was put in to give it concreteness and artistic effect. Nevertheless its theme is the struggle of Odysseus, aided by Athena, to save himself from destruction at the hands of Poseidon. Now Athena is the personification of intelligence and courage, while Poseidon is a symbol of the forces of nature, particularly of such mighty exhibitions of it as are given by the sea.

Not only is there this general basis to show that the *Odyssey* is a picture of the sailor's nature and experiences, but there is also much that reflects the results of the development of the art of navigation. It is a sort of figurative geography. Most of its fanciful episodes have features that probably owe their origin to magnified and distorted accounts of the striking things about the physical or social world that had been made known by sea-faring up to the time of the composition of the poem, as we can see by a brief examination of some of them.

One of the most familiar adventures of Odysseus is the one with Polyphemus. Odysseus and some of his men enter an inhabited cave and await the return of its occupant. Eventually he comes, but he turns out to be an enormous giant with only one eye in the middle of his forehead. His nature is as brutal as his form, for he shows no respect for the sacred obligations of hospitality, but kills and eats some of Odysseus's men, and shuts the rest up for a like fate. Odysseus gives him a skin of wine, which gratifies the giant so much that he asks Odysseus his name, and promises to reward him for his gift by eating him last. Odysseus says that his name is Nobody, and when the wine has overcome its too appreciative recipient, he and his companions put out the giant's single eye, with a sharpened pole. This awakes Polyphemus, and he at once sets up a roar that calls his neighbors of like size to his assistance. When they ask him what is the matter, however, he says: "Nobody has hurt me. Nobody has put my eye out." Whereupon his friends go home in disgust at being called out of bed for nothing. The next day Odysseus and his men escape by hanging underneath the giant's sheep as they pass out of the cave, and suffer nothing more from Polyphemus except the consequences of being under his curse.

It is impossible to analyze this most effective of all nursery tales, and be sure that it expresses anything more than the delight in the wonderful that is so strong in children and primitive people. And yet it can be easily seen that it may reflect the fact that the early navigator often came in contact with a cave-dwelling, cannibalistic people, whose cruelty was only equalled by their stupidity. The enormous size and the single eye may be only the exaggeration stimulated by wonder and demanded by credulity, but it is quite possible that these savages may have been of greater stature than more advanced races, and the single eye may be reminiscent of some idol or some ceremonial headdress connected with the sacrifice of the victims before they were eaten. It may also have arisen from the practice of putting out one of the eyes, for mutilation is a common savage practice.

The interpretation of some of the other episodes is less dubious than this, however. Odysseus is described as reaching a land where night and day are so near together that a shepherd could earn double wages if he could go without sleep. This seems plainly to indicate a vague knowledge of the summer conditions

in high latitudes, and it shows that the "midnight sun" astonished early voyagers as much as it interests tourists to the Scandinavian countries to-day.

Then there are references to floating islands that point to a probable knowledge of icebergs, and there are incidents, like the adventures among the Lotus Eaters and the Sirens, that, although they are probably very largely a poetic presentation of the attractions and temptations that lure the wanderer to forgetfulness of his home or to destruction, yet may also owe their origin to tales of the people of the Orient and Mediterranean littoral, the charms and pitfalls of whose luxurious living and narcotic drugs must have ensnared many a mariner of the ancient world and made him a willing or unwilling exile from his native land.

The *Odyssey* is thus an exposition of the psychology of the sailor, and an enthusiastic recognition of the debt civilization owes to his restless but steadfast spirit. It should therefore have a special interest for all men whose profession is seamanship, and it should be a source of pride to them to realize that their calling and the qualities it necessitates and develops have provided the matter for one of the greatest works of art ever created by the human intellect.



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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

PROPULSION OF SHIPS.¹

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It is doubtful if any branch of engineering has advanced as slowly and cautiously as that branch of marine engineering which has to do with the propelling of machinery. Reliability seems to have been the only thing in view, and economy seems, until very lately, to have received very little consideration.

As an illustration of this point, I would mention that some of the Hudson River boats still have side wheels and use boilers with about 30 pounds steam pressure, producing a brake horsepower with about 30 or 40 pounds of steam.

Steam engines were built as early as 1765, but it was not until 1807 that one was used to propel a boat. Electricity was used for power transmission as long ago as 1876, but its application as a medium for transmitting power to the propeller of a ship did not take place until 1908. This all goes to show that progress in marine propulsion is very slow, the tendency being to follow the old and beaten paths.

Until within the last few years, reciprocating engines were used exclusively for the propulsion of boats, but with the advent of the steam turbine and its almost universal use on shore, where, due to its high steam economy, small size, and light weight, it has practically superseded the reciprocating engine, the practicality of its use for the propulsion of ships began to be considered. It is largely due to the untiring efforts of Sir Charles Parsons that turbines are now rapidly replacing reciprocating engines for the propulsion of ships. It may not be out of the

¹ Presented at a joint meeting of the Electrical Section of the Franklin Institute and the Philadelphia Section, American Institute of Electrical Engineers, held on Thursday, October 11, 1917. Reprinted by courtesy Franklin Institute.

scope of this paper to give some of the reasons why the turbine is preferable to the reciprocating engine as a prime mover.

First: Because it gives simple rotation and admits the possibility of a large range of expansion. At present the best steam engines of the triple- and quadruple-expansion type cannot, on account of the size of the low-pressure cylinder, be made with an expansion ratio of more than 16 to 1 or 20 to 1. In the turbines, however, there are practically unlimited possibilities of expansion, depending almost entirely upon the temperature of the condensing water. A vacuum of 29 inches is not at all an unusual occurrence, and 29.5 inches is being recorded in some of the larger central stations during the winter months. What this means may be better understood when we consider the available energy of a pound of steam when it is expanded from boiler pressure to various degrees of vacuum.

200 pounds pressure to 24 inches vacuum....	220,000 foot-pounds
200 pounds pressure to 26 inches vacuum....	238,000 foot-pounds
200 pounds pressure to 28 inches vacuum....	265,000 foot-pounds
200 pounds pressure to 29 inches vacuum....	289,000 foot-pounds

In other words, a turbine can realize about 25 per cent more of the energy of the steam than the reciprocating engine, which means a saving of 25 per cent in fuel, size of boilers, etc.

The small size of the turbines is, of course, another very important item. Incidentally there are a great many minor advantages, such as saving of oil, attendance, ash handling facilities, etc.

When the turbine is considered for ship propulsion there are a few facts that must be borne in mind, namely:

High-speed turbines are lighter, cheaper, simpler, and more economical than the slow-speed turbine. Propellers, on the other hand, are, within well-known limits, confined to slow speeds for high efficiency. Turbines, therefore, when used for direct connection to the propeller shaft, must necessarily be designed to operate at a speed which is too low for the economical use of steam, and even then cannot be conveniently designed for a speed low enough to secure efficient propeller action. Parsons realized this and advocated the use of direct-connected turbines only for high-speed ocean liners requiring a large amount of power, and the *Mauretania* is probably one of the best examples of ships using this method of propulsion. The horsepower of the *Mauretania*

is 68,000, the speed about 26 knots, and about 43.5 tons of coal per hour is required. The water rate obtained is about 11.5 or 12 pounds and the coal consumption about 1.5 pounds per shaft horsepower-hour.

A few years later, when the White Star Line decided to build the *Olympic* and the *Titanic*, which were slow-speed ships requiring about 45,000 horsepower, Mr. Parsons advocated a combination of two reciprocating engines exhausting into a low-pressure turbine, which gave him an economy about comparable with the *Mauretania*.

As you doubtless all know, the steam engine is a very efficient prime mover when operating in the higher temperature ranges; that is, an engine may have as high as 80 per cent thermodynamic efficiency when operating from boiler pressure to atmosphere, whereas if it was operated down to a 28-inch vacuum the efficiency would not be greater than 40 or 50 per cent. On the other hand, the turbine works efficiently in the low-pressure end of the cycle, so that by using a reciprocating engine in the upper ranges in combination with a turbine to utilize the energy in the low-pressure ranges an overall efficiency is obtained which may be above that obtainable with either the reciprocating engine or the turbine when working alone. In the *Olympic*, all reversing and maneuvering is done with the reciprocating engines, making it possible to build a simple and efficient low-pressure turbine.

It is therefore necessary, in order to obtain the advantages of the high-speed turbine and at the same time to be able to use a low-speed efficient propeller, to have some form of reduction gear between the propeller and the prime mover. This condition is what led up to the application of electricity to the propulsion of ships, to the mechanical reduction gear, and also to speed reduction by means of hydraulic transmission. Electric propulsion is best suited to very large, high-powered vessels, especially in cases where good economy is desired at two or more speeds, as in the case of warships. The reasons for this are as follows:

Electric transmission affords a very simple and practical means of speed reduction in almost any ratio which may be desired.

It affords a very simple means of reversal by a change of electrical connections without mechanical devices, complication of piping, valves, etc. Any desired reversing torque can be obtained without affecting the efficiency of the equipment in the forward direction.

In the case of battleships, the feature that is particularly important is that electric transmission affords means by which the ratio of speed reduction is changeable by simple electrical connections, thus making possible the economical use of the same apparatus, both under high-speed and cruising conditions.

Electric transmission makes it possible to use a plurality of cruising and generating units, so that damage to one or more parts will not disable the vessel.

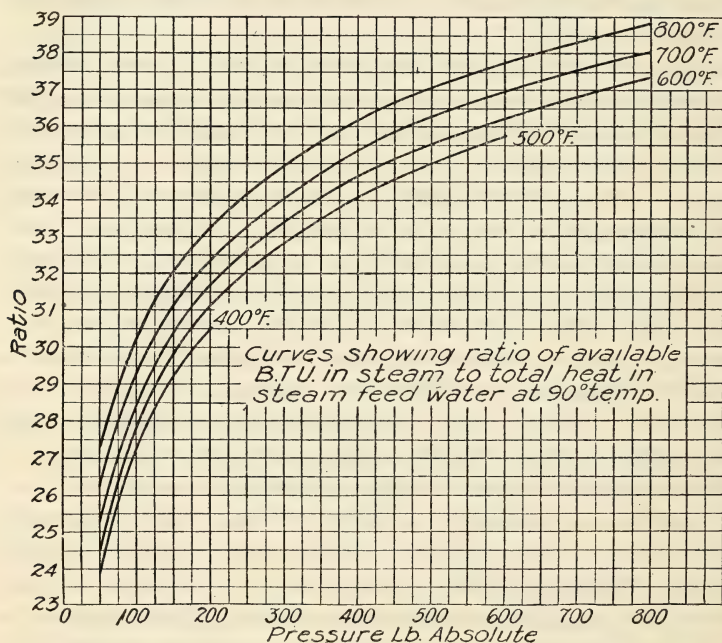


FIG. 1.

With electric transmission, high steam pressure and superheat can safely be used, and the gain in fuel economy by its use is best shown by these curves. A steam temperature of 700° is now successfully used in Europe, which with 500 pounds steam pressure would give a superheat of 233°. Heat available for work would then be about 36.3 per cent, whereas under ordinary steam conditions, say 200 pounds pressure and 50° superheat, we have only 30.75 per cent available, a net gain of 18 per cent in fuel, which would more than compensate for any additional weight or cost of the electrical equipment.

Turbo-generators are now built with an efficiency of over 80 per cent, which with motors of 95 per cent efficiency and a boiler efficiency of 80 per cent would produce a shaft horsepower-hour with 0.825 pound of coal (containing 14,000 British thermal units per pound) or 0.61 pound of oil (19,000 British thermal units per pound), the latter figure comparing favorably with Diesel engines when lubricating oil is taken into consideration.

The first electrically propelled boats in this country (outside of electric launches) were two fireboats in the city of Chicago, the *Joseph Medill* and the *Graeme Stewart*, which were equipped with electric propelling machinery in 1908. Their equipment consists of two Curtis turbo-generating units of 1000 horsepower capacity each. Each turbine is connected to a 250-kilowatt, direct current generator and a 1000-horsepower centrifugal pump. There are two propellers, each driven by a 250-horsepower, direct-current, 220-volt motor. The equipment is arranged for pilot-house control. The wonderful maneuvering qualities, simplicity of control, and fine economy of these boats, together with the fact that up to the present time no money has been spent for repairs to the electric propelling machinery, make the vessels the most efficient fireboats in the country and probably in the world. In the case of these fireboats, direct-current apparatus, with its complication of brushes and commutators, was used, but for larger installations alternating current is used, which greatly simplifies the apparatus.

The second example of electric propulsion is the large United States collier *Jupiter*. Due to the wonderfully fine performance of this collier, which has now been in service for about four years, the Navy Department decided to install electric propelling machinery in the battleship *New Mexico*, which is now nearly completed at the New York Navy Yard, and the apparatus for which has recently passed all government tests at the Schenectady Works of the General Electric Company. The Navy Department has also decided to install electric propelling machinery in six other new battleships requiring about 33,000 horsepower each, and in five large battle cruisers requiring about 180,000 horsepower each.

Mr. W. L. R. Emmet, to whom all credit is due for the introduction of electric drive in vessels in this country, read a paper before this Institute, about four years ago, describing quite fully

the *Jupiter* equipment as being built, and predicted results in regard to economy which have more than been borne out in actual service. A short description of the *Jupiter* will be given.

The *Jupiter* is a sister ship of the *Cyclops* and the *Neptune*. They each have 20,000 tons displacement and a carrying capacity of about 12,000 tons of cargo. The principal dimensions are: Length, 548 feet; breadth, 65 feet; depth $39\frac{1}{4}$ feet; draft, 27 feet 6 inches. The *Cyclops* is equipped with reciprocating engines and the *Neptune* with Parsons geared turbines (built by the Westinghouse Company).

In giving the General Electric Company the contract for the *Jupiter* equipment, a water rate of 13 pounds per shaft horsepower at 14 knots and 15 pounds per shaft horsepower at 10 knots was guaranteed. It was also provided that in case of failure of the electrical equipment it should be removed without expense to the government, so that reciprocating engines which were originally contemplated for this vessel could be installed in its place. This feature limited the design somewhat, for, while it was believed by its designers that electric propulsion would show a great advantage over any other system, even greater improvement could have been accomplished if the vessel had been designed with a view to obtaining all the advantages incident to electric drive.

During her official trials the *Jupiter* maintained an average speed of 15 knots for 48 hours, with 7152 horsepower delivered to the propeller shafts and a propeller speed of 116.72 revolutions per minute. The water rate as actually measured was 11.68 pounds per shaft horsepower-hour. Due to the fact that the steam pipe between the boiler and turbine was too small, the steam pressure at the turbine was only 168 pounds instead of 190 pounds, for which the machine was designed. Since the official trials took place a larger steam pipe has been installed and the water rate reduced to 11 pounds.

During her 10-knot run the water rate was 12.31 pounds. It will be seen from this that the guaranteed water rates of 13 and 15 pounds were beaten by about 20 per cent. The *Jupiter* is to-day, according to the government records, making a speed of 12 knots with a coal consumption of only 55 tons a day, which is a record about 35 per cent better than any boat of her size afloat to-day. The *Cyclops* on her trials developed 14.6 knots with

about 6000 horsepower and a steam consumption of about 14 pounds, or about 25 per cent greater than the *Jupiter*.

The *Neptune*, equipped with Parsons geared turbines, has just recently had her trials and the published results give us the following comparison with the *Jupiter* and *Cyclops*:

	U. S. Naval Colliers		
	<i>Cyclops</i>	<i>Neptune</i>	<i>Jupiter</i>
Weight of propelling machinery only, tons.....	280	150	156
Steam consumption at maximum speed, pounds per shaft horsepower-hour	14.0	13.4	11.1

The equipment of the *Jupiter* consists of one turbo-generating unit with an induction motor coupled to each of the two propeller shafts. The generator is of the 3-phase type designed for a normal output of 5000 kilowatt at 2300 volts. At a speed of 14 knots the turbine runs at about 2000 revolutions per minute and the motors at 110 revolutions per minute. The generator has two poles and the motors 36 poles, making a speed reduction of 18 to 1.

The speed of the ship is controlled by a governor which was specially designed for a very wide range of speed adjustment. It operates from the maximum speed down to a speed of four or five knots per hour. The speed can also be controlled independently from the main throttle valve, which is also designed so that in case of excess speed it is closed automatically by the emergency governor, which operates independently from the main governor and is set to close at a speed slightly higher than the maximum speed of the boat.

The motors are of the 3-phase induction type and have 36 poles. The windings are made waterproof. The rotor windings of the motors are connected to collector rings, which under normal conditions are short-circuited by a slider on the shaft. These collector rings are connected by means of brushes to water-cooled resistances, which are provided for the purpose of obtaining a high torque in starting or reversing. In this particular case they are designed to give more than full-load torque. When the motors are running with this resistance in the circuit the current flowing to the motors is always limited so that all the maneuvering can be done by simply opening and closing the ahead and reversing switches.

When running with the resistance in, the *Jupiter* will reach a speed of about 10 knots. These resistances afford a very quick

and powerful reversal, but the ship can be operated without them, and is, as a matter of fact, a great deal of the time. In this case, reversing is accomplished by slowing down the generating unit, which also slows down the propellers, the reverse connections are made, and the turbine again brought up to speed, which will bring the motors up to speed in the reverse direction.

The switchboard equipment is very simple. It consists of one ahead and one reversing switch for each motor, a field switch for the generator, ammeter, voltmeter, wattmeters, and frequency meters graduated in revolutions per minute. The switchboard has also integrating wattmeters which record on a dial the total amount of power going to each motor and makes a very interesting record for each trip of the boat.

The excitation of the generator is obtained from the lighting circuit of the ship, which consists of three small turbine-driven, direct-current generating sets. One of these sets is more than sufficient to furnish the necessary excitation.

The third instance of electric propulsion is the new U. S. battleship *New Mexico*, which is now under construction at the New York Navy Yard. This installation provides conditions where the advantages of electric propulsion can be realized. The *New Mexico* is the largest and most powerful battleship which has been laid down by our navy up to the present time. She will have a displacement of 32,000 tons and a designed speed of 21 knots, requiring about 28,000 horsepower. The propelling machinery is, however, designed to deliver a maximum of 37,000 horsepower, and it is believed that this will give her a speed of 22 knots.

The equipment will consist of two turbo-generating units, four propelling motors (one for each shaft), switching apparatus, cables, instruments, etc. The contract also calls for two 300-kilowatt non-condensing, direct-current turbo-generators, which will furnish excitation and power to drive the auxiliary machinery. As the General Electric Company was required to guarantee the steam consumption of the propelling machinery, including the auxiliaries, the greatest care was taken in their selection, and they are all to be electrically driven. The exhaust steam from the direct-current generating sets which operate non-condensing will be used for heating the feed water, and any that may not be required for this purpose will be exhausted into the main turbine.

The generators for the *New Mexico* are bi-polar alternators, and the motors are arranged to be connected for either 24 or 36 poles. For economic cruising at a speed of 15 knots or less, only one generating unit will be required with the motors on the 36-pole connection. For higher speeds the 24-pole motor connection will be used with both generators. One generator, however, will be capable of driving the boat up to a speed of about 19 knots.

Speed variations with either motor connection will be obtained by varying the generator speed, and a governor will be installed similar to that used with the *Jupiter* equipment.

The steam consumption guaranties as made to the government cover the total amount of steam used both by the main generating units and the auxiliaries, and are as follows:

STEAM PRESSURE 250 POUNDS GAUGE AT THROTTLE.

10 knots	.....	14.6 pounds per shaft horsepower-hour
15 knots	.....	11.4 pounds per shaft horsepower-hour
19 knots	.....	11.1 pounds per shaft horsepower-hour
Max. speed	.....	11.9 pounds per shaft horsepower-hour

Very heavy penalties are attached to these guaranties in case they are not met, namely, \$25,000 per pound for the two lower speeds and \$20,000 per pound for the two higher speeds.

At full speed the *New Mexico's* propellers will operate at 175 revolutions per minute, the lowest speed permissible within the space allowed. The propeller speed for the sister ship of the *New Mexico* with Parsons type turbines is 240 revolutions per minute, which according to Captain Dyson, would indicate a propeller efficiency 9 per cent worse than is expected on the *New Mexico*, and this difference would more than compensate for the electrical losses in the motors and generators.

In order to be able to correctly judge the relative economy of different methods of propulsion, it may be interesting to compare the water rate per effective horsepower, taking for examples of such different methods the battleships *Florida* and *Utah*, which are equipped with Parsons turbines; the *Delaware*, which has reciprocating engines, and the *New Mexico*, with electric drive.

	Propeller speed	Water rate per effective horsepower per hour		
		12 knots	19 knots	21 knots
<i>Florida</i>	328	31.8	24.0	23.0
<i>Utah</i>	323	28.7	20.3	21.0
<i>Delaware</i>	122	22.0	18.7	21.0
<i>New Mexico</i>	175	17.3	15.0	16.4

The guaranteed weight of the propelling machinery for the *New Mexico* without the auxiliaries is 530 tons, with a penalty of \$500 per ton for any excess over this amount. The estimated weight of the Parsons turbine equipment for this vessel was 653 tons.

The contract price for the *New Mexico* machinery was \$431,000, and the Navy Yard estimates show that a saving of \$200,000 will be effected by using this equipment instead of the Parsons equipment as originally contemplated.

ELECTRIC PROPULSION FOR LARGE BATTLE CRUISERS

These vessels are designed to have a speed of 35 knots, at which speed they will require about 180,000 horsepower. There are four propellers operating at 250 revolutions per minute at maximum speed.

The installation proposed for these ships consists of four high-speed turbo-generators, each having a capacity of about 35,000 kilowatts. On each propeller shaft there will be two independent induction motors, each having a capacity of 22,500 horsepower. The switchboard will be provided with an arrangement by which any combination of generating units and motors can be used, and starting, stopping, and reversing can be instantly done by movement of a lever. All changes of connections are made on dead circuits, so that there can never be any big rushes of current to strain the apparatus. Safety devices are also provided so that any unbalancing of current will open the circuit of that particular unit in which it occurs.

The total weight of the complete equipment for one of these vessels is about 1800 tons, of which the turbines alone weigh about 350 tons.

That electric propulsion can also be profitably applied to a small boat is proved by Mr. Ljungstrom, in Sweden, in the case of the small coastwise steamer *Mjolner*, which is only 225 feet long, 56 feet beam, and 15 feet draft, requiring 900 horsepower. Stockholm's Rederiaktiebolaget Svea decided to build two sister ships, the *Mimer* and the *Mjolner*. The *Mimer* was equipped with triple-expansion engines, and Mr. Ljungstrom guaranteed a saving of 30 per cent in fuel with his method of electric propulsion in the *Mjolner* over the *Mimer* equipped with engines. The boats have now been built and tested, and the electrically propelled boat

showed a saving of 42.3 per cent in fuel consumption. This is indeed a remarkable record, but may be partly explained by the increased efficiency of the boiler plant. For his electric drive Ljungstrom uses 218 pounds steam pressure and 235° super heat, and this alone would effect a saving in coal over the *Mimer* of about 15 per cent.

In this boat Ljungstrom uses two 400-kilowatt turbines running at 7200 revolutions per minute, generating 3-phase, 120-cycle current at 500 volts. This current is used to drive two induction motors which are geared to the main propeller shaft. The motors run at 900 revolutions per minute and the propeller shaft at 90 revolutions per minute. All of the auxiliaries are electrically driven, which affords another appreciable saving.

Mr. Ljungstrom has done some wonderfully fine engineering in connection with this equipment and has combined electric propulsion with mechanical gearing, which is a great step forward.

The greatest competitor of electric drive at the present time is the high-speed helical gearing which is now coming into such universal use. This method of drive has, however, certain limitations as compared with electric drive, some of which I will endeavor to mention. The maneuvering qualities cannot be made equally as good as with electric drive. Noise is, of course, practically eliminated with electric drive, whereas with gearing there must be some noise. There are also certain mechanical limitations to the use of gears which do not exist with electric drive. Briefly stated they are as follows:

The stresses on the tooth surfaces increase with the diminution in the number of teeth in the pinion, making it difficult to use very small pinions in order to secure large ratios of speed reduction. The length of the pinion and the output for a given diameter is limited, due to the torsional elasticity of the metal, which prevents equal distribution of load over the whole surface. As the gears become large and long, springing of the hull of the ship in a heavy seaway tends to throw very heavy strains on the teeth.

For installations where a large amount of power is required, multiplication of pinions becomes necessary, which means dividing up the turbine element into smaller units. This, of course, tends to decrease the efficiency, increase the weight, and produce a much more complicated outfit. In cases where large powers are

required with slow-speed propellers, the gears become very large and expansion strains due to heat may introduce great errors in the surface engagement of the gears which would throw prohibitive strains on the teeth.

With gear drive, reversing turbines are always necessary, and they introduce considerable loss, as they are always running in the reverse direction when the ship is going ahead. The losses due to this turbine friction amount to about $1\frac{1}{2}$ to 2 per cent.

At the present time, for vessels requiring up to about 12,000 horsepower, or 6000 horsepower on each propeller shaft, mechani-

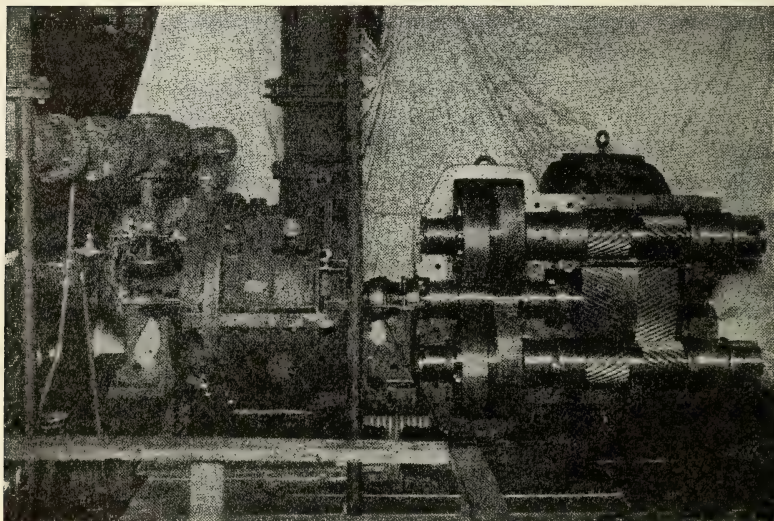


FIG. 2.—1750 horsepower turbine and 3200/137 R. P. M. reduction gear for U. S. S. *Nevada*.

cal gearing is lighter, cheaper, and more efficient than electric drive. For destroyers or light scout cruisers, where saving of weight is of the utmost importance, the high-speed geared turbine has no competitor.

About five years ago the General Electric Company began experimenting with flexible gears of the Alquist type, and results obtained showed that with this type of gear heavier loads could be carried than with solid gears, also that the noise was very materially reduced. The Alquist flexible gears are built up from disks suitably formed so as to facilitate axial deflection. On

account of helical angle there is a component of the driving pressure acting at right angles to the disks, and it is evident that the resultant axial deflection causes also a relative displacement of the tooth line in the direction of the drive.

On account of this flexibility, an equal pressure is assured for all of the disks and an equal distribution of pressure along the driving line. The freedom from heavy overloads, which in solid gears is caused by errors in cutting at some part of the tooth surface and more especially at the ends of the teeth by the twisting

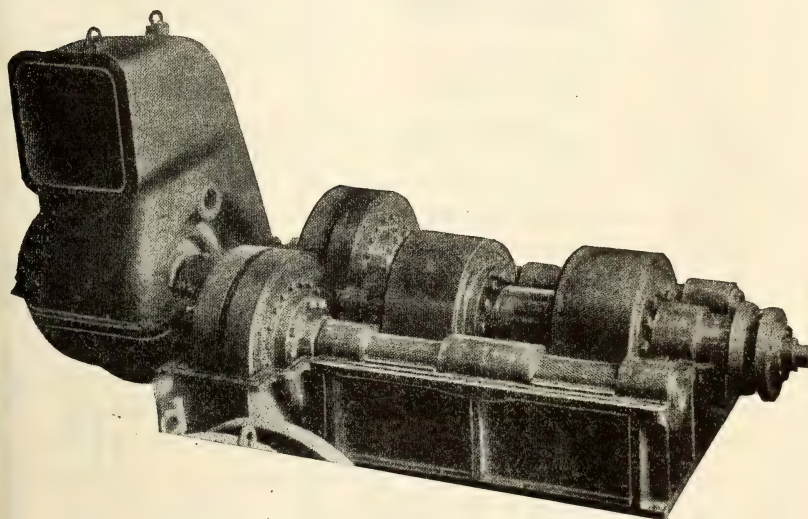


FIG. 3.—Curtis turbine and one-plane flexible type reduction gear for ship propulsion.

of the pinion under load, makes it possible to use a finer pitch than in solid gears, and this, of course, increases the output for the same length of pinion. To understand this, it must be remembered that the shape or curvature of the teeth does not depend upon the diametrical pitch, but only on the gear diameters. The finer the pitch, the more driving points per unit length of face and the greater load which can be carried.

Gearing of this type has been applied to about 150 high-speed turbines for connection to electric generators, and the unqualified success of these sets after two years of hard service led the General Electric Company to enter the marine field. Contracts

S. S. "LA BREA"

Voyage	Date	Total distance in knots	Average speed in knots per hour	Total barrels delivered	Name of port	Total fuel steaming on voyage in barrels	Total barrels per knot steaming	Total barrels used in port and in	Total barrels per knot steaming and in port	Time in port hours	Barrels discharged per hour	Cost at 80 cents per barrel steaming and in port (fuel)	Shaft horsepower hours	Pounds of oil per shaft horsepower
1	March 9-15, 1916.	650	9.5	62,578	Oleum.....	574	.883	142	1.10	36½	1714	\$.88	116,000	1.67
2	March 15-26.....	2,037	11.33	73,600	Seattle.....	1459	.716	152	.79	37½	1962	.632	595,000	.941
3	March 28-April 6.	2,108	11.01	84,676	Vancouver.....	1584	.751	155	.824	26	2487	.659	530,000	1.01
4	April 8-May 16...	92,545	10.97	8,642	Seattle.....	6896	.....	...	.....	13½	640	.....	.....	.....
5	May 17-23.....	450	11.20	19,045	Takal.....	321	.745	117	.757	35½	1544	.605	2,330,000	1.00
6	May 24-July 1....	91,965	10.65	77,202	Oleum.....	6000	.713	134	1.01	39	1228	.808	118,000	.911
7	July 1-Aug. 9.....	9,184	10.39	71,824	Antofagasta.....	6875	.75	109	.762	25	2660	.609	2,200,000	1.06
				71,791	Port San Luis to Antofagasta, Chili and return		.748	107	.76	42.3	1697	.609	2,230,000	1.04
	Average speed.....	10.9												

Total pounds of oil steaming, 8,270,000. Total shaft horsepower-hours, 8,029,000. Pounds of oil per shaft horsepower-hour, 1.03.

S. S. "LOS ANGELES"

Voyage	Date	Total distance in knots	Average speed in knots per hour	Total barrels delivered	Name of port	Total fuel steaming on voyage in barrels	Total barrels per knot steaming	Total barrels used in port and in	Total barrels per knot steaming and in port	Time in port hours	Barrels discharged per hour	Cost at 80 cents per barrel steaming and in port (fuel)	Shaft horsepower hours	Pounds of oil per shaft horsepower
1	April 9-15.....	423	9.4	67,674	Oleum.....	556	1.31	164	1.70	64½	1099	\$1.36	74,600	2.48
2	April 16-25.....	1845	10.13	74,739	Vancouver.....	1656	.897	218	1.01	33½	2214	.808	394,000	1.41
3	April 27-May 25..	6549	10.22	73,734	Panama.....	5579	.851	169	.877	46½	1577	.701	1,420,000	1.315
4	May 26-29.....	220	9.1	72,372	Oleum.....	221	1.00	123	1.56	41	1770	1.24	39,000	1.88
5	May 30-June 27..	6348	10.6	72,538	Balboa.....	5462	.86	159	.885	35	2072	.708	1,400,000	1.255
6	June 29-Aug. 7, '16	9151	10.24	71,007	Port San Luis to Antofagasta, Chili, and return	8293	.906	186	.926	56.3	1261	.74	2,130,000	1.31
	Average speed.....	10.27												

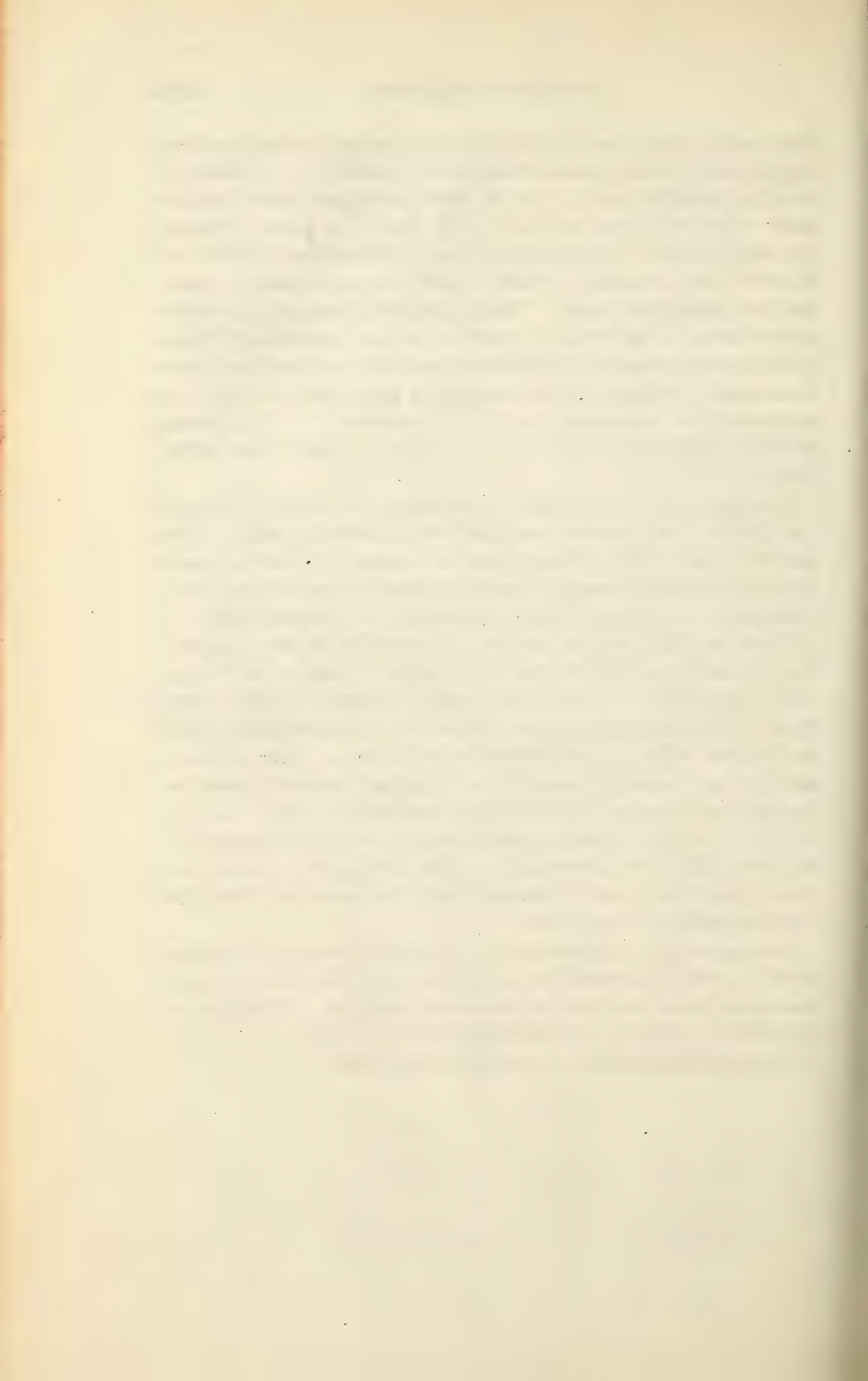
Total pounds of oil steaming, 7,310,000. Total shaft horsepower-hours, 5,538,000. Pounds of oil per shaft horsepower-hour, 1.320.

have now been closed for about 250 marine propulsion sets, aggregating about 700,000 horsepower; about 40 of them are now in operation, and a few of them have gone about 100,000 knots with no replacement of either pinion or gears. Among the more important installations I may mention the cruising turbines for the battleship *Nevada*, which have now been in operation for almost two years. There are also about 25 2400-horsepower outfits in operation, as well as the two Luckenbach boats, each of 4000 horsepower, which on their trial trip developed 5200 horsepower. Among the important sets now being built may be mentioned the equipment for U. S. destroyer *No. 69*, having 21,000 horsepower and the U. S. S. *Salem*, having 20,000 horsepower.

The tables (p. 1050) show a comparison of the *La Brea* and *Los Angeles*, the former equipped with a geared Curtis turbine and the latter with a triple-expansion engine. It will be noted that the *La Brea* consumed only 1 pound of fuel oil per shaft horsepower, as compared with 1.31 pounds for the sister ship.

There is still another method of speed reduction; namely, the hydraulic gear as proposed by Doctor Föttinger in Europe, which consists of a centrifugal pump driving a water motor. With this arrangement he has obtained a combined efficiency of 90 per cent with a speed reduction of 4 to 1. The efficiency falls off very rapidly, however, with higher ratios of speed reduction, and reaches about 80 per cent with a speed ratio of 10 to 1. The mine-laying vessel *Koenigin Louise* was equipped in this way, this vessel having been sunk during the present war. Rapid wear and small clearances are the principal difficulties with this method of propulsion.

This paper has described to you some of the latest developments in marine propulsion and shows that the United States has again taken the lead in marine engineering. With the activities now going on in shipbuilding in this country, we can look forward in the near future to even greater results.



U. S. NAVAL INSTITUTE

SECRETARY'S NOTES

Prize Essays The attention of all the members and the subscribers to the U. S. NAVAL INSTITUTE PROCEEDINGS is invited to the new rules governing the Prize Essay contest for 1919 under the heading of Special Notice in this number. It is requested that authors who are writings or who contemplate writing essays submit them at their earliest convenience, as the Institute is in pressing need of articles for publication in the PROCEEDINGS.

Topics for Essays The board of control invited the Chief of Naval Operations, Commanders-in-Chief of the U. S. fleets, Chiefs of Bureaus, Presidents of the U. S. Naval Institute and Naval War College, and the Superintendent of the U. S. Naval Academy to suggest topics for essays. The suggested topics received to date will be found opposite the Special Notice, and the list will be added to as the suggestions are received.

Essays Submitted A few members have answered the secretary's appeal for material for publication in the PROCEEDINGS, and it is hoped that other members will in the near future submit articles for publication.

Prize Essay The Secretary of the Navy disapproved, for the present, the publishing of the Prize Essay of 1918, subject, "Letters on Naval Tactics," by Lieutenant H. H. Frost, U. S. Navy, and the essay receiving Second Honorable Mention, subject: "Naval Strategy," by Rear Admiral Bradley A. Fiske, U. S. Navy.

The Navy Department does not approve of the publishing of articles written by naval officers on the subjects of strategy and tactics during the continuance of the present war.

Membership Since March, 413 regular members, 5 associate members and 1 life member have joined the Institute. Total membership 4865.

Deaths:

Lieutenant Commander R. M. Elliot, Jr., U. S. N.
Lieutenant H. M. Meyers, U. S. N.

Because of the fact that many copies of the PROCEEDINGS are being returned by the Postal Authorities, *all members are urged to keep the Secretary and Treasurer informed of the address to which PROCEEDINGS are to be sent, and thus insure their receipt.*

This precaution is now of particular importance as notices of changes of stations are not now available for the use of the Institute's staff.

Members and subscribers are urged to notify the Secretary and Treasurer promptly of the non-receipt of PROCEEDINGS, in order that tracers may be started. The issue is completed by the 10th of each month.

Dues It is requested that members who have not paid their 1918 dues of \$2.50, do so at their earliest convenience.

Book Announcements Attention is invited to the List of Book Publications for a complete catalogue of books revised and republished by the Institute.

Due to a delay in receiving the approved manuscript for the Landing Force Manual U. S. Navy 1917, the Manual will not be ready for issue until about August 1, 1918.

The Naval Artificer's Manual has been revised and will be ready for issue about June 15, 1918. The revision of the "School of the Ship" has been delayed indefinitely.

Discount on Books The five per cent additional discount allowed to purchasers of books whose accounts during a calendar month amounted to a hundred dollars or over has been discontinued.

Book Department The Institute Book Department will supply any obtainable book, of any kind, at retail price, postage prepaid. The trouble saved the purchaser through having one source of supply for all books, should be considered. The cost will not be greater and sometimes less than when obtained from dealers.

Reprints of Articles The attention of authors of articles is called to the fact that the cost to them of reprints other than the usual number furnished, can be greatly reduced if the reprints are struck off while the article is in press. They are requested to notify the Secretary and Treasurer

of the number of reprints desired when the article is submitted. Twenty copies of reprints are furnished authors free of charge.

Authors of articles submitted are urged to furnish with their manuscript any illustrations they may have in their possession for such articles. The Institute will gladly co-operate in obtaining such illustrations as may be suggested by authors.

Original photographs of objects and events which may be of interest to our readers are also desired, and members who have opportunities to obtain such photographs are requested to secure them for the Institute.

Members are invited to send to the Secretary comments, suggestions or criticisms on the make up of the PROCEEDINGS, and to submit topics for essays.

Whole Nos. 145, 146, 147, 149, 155 and 166 of the PROCEEDINGS (March, 1913, June, 1913 September, 1913, January-February, 1914, January-February, 1915, and November-December, 1916) are exhausted; there are so many calls for single copies of these numbers that the Institute offers to pay for copies thereof returned in good condition at the rate of 25 cents per copy.

ANNAPOLIS, MD., April 8, 1918.

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PROFESSIONAL NOTES

PREPARED BY

LIEUTENANT GEO. B. KEESTER, U. S. Navy

GENERAL ARRANGEMENT

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ARGENTINA

GERMANY PROTESTS ALLIED SHIP LOADING AT BUENOS AYRES.—The German newspapers, German citizens and such German officials as are left here protested vigorously to the Argentina Government against permitting an American supply ship to remain here or load meats for the American fleet. President Irigoyen, however, has informed Ambassador Stimson that the vessel may remain in port as long as may be necessary.—*N. Y. Herald*, 25/3.

AUSTRIA

AUSTRIAN NAVAL CONSTRUCTION.—Italian papers report the completion, at Pola, of a new light cruiser, said to be named *Zenta*, and described as a larger edition of the *Spaun* class. The details, which must be accepted with reserve, are as follows: Displacement, 4300 tons; speed, 30 knots; armament, six 5.9-inch guns. This may be one of the three cruisers authorized in May, 1914, none of which had been commenced prior to the war. It is further stated that between 16 and 20 destroyers have been added to the Austro-Hungarian Navy in the last three years.—*Engineer*, 8/3.

AUSTRIAN SHIPPING LOSSES.—According to the *Vossische Zeitung*, the Austrian mercantile marine—which amounted to 773,000 tons in 1914—will emerge from the war with comparatively small losses. The enemy

has sunk or seized about 48,000 tons. About 140,000 tons have been seized in enemy countries. These losses, plus the sales to Italy before the latter entered the war, have been partly counterbalanced by the building of 125,000 tons, which are finished, or will be finished, within six months after the war. The net loss of the Austrian mercantile marine during the war will not exceed 160,000 tons, or 20 per cent, of its peace tonnage. The financial situation of the Austrian shipping firms has been strengthened to an extraordinary degree by the enormous profits accruing from the sale of ships in foreign ports. They have sold a total of 80,000 tons, of which 15,000 tons belonged to the Austrian Lloyd and 42,000 tons to the Austro-Americana, and for which they obtained prices many times the amount at which they stood in the companies' books. The Austro-Americana has received 70,000,000 kronen for the ships they have sold, whereas before the war the value of the whole fleet was entered in the books at 29,000,000 kronen.—*Nautical Gazette*, 4/4.

BRAZIL

EX-GERMAN SHIPS SEIZED BY BRAZIL ARE USED AS CRUISERS.—Two of the ex-German ships seized by Brazil have been taken into the navy of that nation. The new cruisers are the *Belmonte*, formerly the *Posen*, and the *Parnahyba*, formerly the *Alrich*. Others are now in the country's merchant marine. All are steamers save one, which is a sailing vessel. A line of first-class passenger and cargo steamers will be started to Europe and New York, with the new ships and others held in reserve, for coasting trade. The first ex-German boat to go into service is the *Hohenstaufen*, now the *Cuyaba*.—*Naval Monthly*, April.

BRAZIL WANTS U. S. TO ASSIST IN REPAIRING GERMAN SHIPS.—Brazil has asked that officers from the Construction Corps of the navy, who can be spared, be sent to that country to assist in repairing the German ships seized there. The remarkable efficiency with which the interned ships here were prepared for sea prompted the request. No order has been issued.

Although many of the interned *German vessels in Brazil* were damaged by their German crews and officers before the Brazilian seizure, in the idea that they could not be used by Germany's enemies, several of the steamers are already in service and the remainder will be in commission in the near future. As far as has been announced, but one of the ships will necessitate repairs beyond the facilities of Brazilian shipyards. The steamer *Leopoldina*, a 12,000-ton steamer, will be towed to the United States for overhauling.—*Shipping*, 23/3.

GERMANY

LONGER PERISCOPES ON GERMAN SUBMARINES.—Discussing the question of the war's influence on submarine design, an American expert says, that the danger of ramming induced a radical increase in the length of the periscopes up to about 10 meters in some of the latest German boats. By this means it is possible, he points out, to keep a lookout in fairly rough weather with several feet of periscope exposed, at the same time maintaining a sufficient depth of water above the vessel herself to practically preclude the possibility of successful ramming. The conning-tower remains as the only vulnerable part in this condition, and the destruction of the tower, while serious enough, by no means entails the loss of the boat. To reduce resistance to propulsion submerged and at the same time obtain sufficient rigidity in the free portion of the periscope above the highest bearing, the use of these extremely long periscopes has necessitated

an increase of the housing distance to the greatest practicable degree, the eye-piece in some cases being almost in the bottom of the boat when the periscope is fully housed.—[Syren and Shipping.]—*Nautical Gazette*, 28/3.

GERMANY'S TERMS FOR NEUTRAL SHIPPING.—It is reported that a serious state of affairs is likely to arise after the war for Scandinavian and Dutch shipbuilders. It is practically impossible for these to obtain the raw material for construction from this country or from any other than a German source. She first demands goods of which she is badly in need at the present time for warlike operations, then insists that the vessels constructed with her steel must be employed exclusively in German trade for five years after the war, or that they must not be chartered to or used by citizens of any of the allied countries for a similar period, and further, that in the event of sale, German buyers must have the option of purchase. In regard to ship repairing, there are similar conditions, and also it is declared that no ship shall be repaired with German steel by any firm on the German "black list." Apparently the effect of Germany's conditions is that any boat, which is even partly built or repaired by the use of German steel plates, is no longer a free trader, but is during the war and for years afterwards to be employed as Germany directs.

The difficulty is that the Swedish, Danish, and Dutch builders, whilst they recognize the serious disadvantages which directly and indirectly result from compliance with German conditions, are faced with the closing up of their shipbuilding and ship repairing yards if they refuse.—*Pages Engineering Weekly*, 8/3.

"INDEMNITIES" FOR GERMAN SHIPPING.—Herr Huldermann, a well-known director of the Hamburg-Amerika Line, indicated in a speech at Hamburg last week, that the appetites of the shipping interest have by no means been satisfied by the enormous subsidy which was granted last year by the Reichstag.

After pessimistic references to the probable duration of the war and the "economic changes all over the world," Herr Huldermann said, that, with the constant rise in price of materials, German shipping would require a large expenditure of capital in addition to the government subsidy. Consequently "one of the most important peace demands would be compensation from enemy states for the confiscation and employment of German ships." At the same time they would have to demand unconditionally the restoration of all the oversea establishments which were formerly used by German shipping and trade.—*London Times*, 4/3.

DELAYED PAYMENTS FOR DEPREDATIONS ON NEUTRAL SHIPPING.—Germany, according to a Stockholm despatch, has adopted the time check system of *paying for the depredations of her U-boats* on neutral shipping. The checks to be issued in compensation cannot be cashed until two years from date. Germany does not admit that all, or even a large number of neutral ships, were "spurlos versenkt" without warrant. But even in those cases in which she admits damages for torpedoing, no actual cash will be paid.—*Shipping*, 23/3.

GERMAN STEAMERS AT ODESSA.—At the outbreak of war only two German steamers were held in Odessa, the *Gregor*, belonging to Jebsen and Dieduchsen, of Hamburg, and the *Olga*, belonging to the Reederei A. G. von, 1896. The former has been handed over to the owner, the latter was used by the Russians as a transport and was torpedoed and sunk.—*Nautical Gazette*, 4/4.

GERMANY TO RETALIATE IN PROPERTY SEIZING.—The Spanish and Swiss ambassadors at Berlin have been directed by the German foreign office to notify the American Government that, Germany will proceed with meas-

ures against American property in Germany in the same proportion that action is taken against German property in the United States, Reuter's Amsterdam correspondent reports.—*Washington Evening Star*, 18/3.

HELIGOLAND BIGHT.—An official communication issued here to-day states that, according to a note received from the German Government, neutral shipping in the area of the Heligoland Bight, which has already been declared dangerous by the British Government, will henceforth be exposed to additional danger in consequence of measures taken there against its enemies by the German Government.

It is added that navigation in this region will only be safe if certain directions are followed, for which application may be made to the German authorities.—*Reuter*.—*London Times*, 11/3.

GERMANY'S PLANS FOR MINING THE SEA.—It is quite in accordance with the general fitness of things that since the very start of the war the Germans have sought to make every possible use of the mine. The submarine mine is, of course, a perfectly legitimate weapon of naval war, but it is not one of those that make any great appeal to the average clean-minded man; and it goes without saying that the Germans have never hesitated to use it, contrary to the terms of The Hague Convention to which they pledged themselves, both by scattering it broadcast on the high seas, planting wide areas without notifying shipping, and laying fields with the sole object of entrapping merchantmen. All these things were forbidden by The Hague Convention.

As the war has progressed the cult of the mine in Germany has expanded rapidly. The first fight in the North Sea occurred on August 5, 1914, when the German auxiliary *Königin Luise* was interrupted by a British destroyer flotilla while laying mines off the English east coast, and sunk. The light cruiser *Amphion* came to grief in this mine field next day. The first evidence that the Germans were fitting their ordinary warships as mine-layers came in December, 1914, when, after the "tip-and-run" bombardment of English northeast coast towns by a squadron of fast German cruisers, a great number of mines were found to have been deposited in the vicinity, the sweeping operations occupying nearly a fortnight.

The regular warships used their mines for other purposes as well. The German staff very sagely calculated from the beginning that the great majority of encounters in the North Sea would rapidly and inevitably develop into a chase—the German ship leading and the enemy pounding along behind struggling to disable her before she could reach the security of her own waters. They therefore fitted large numbers of their ships with stern shoots through which mines could be dropped in the hope that the pursuing vessel would run up against them. A later trick was to couple the mines together by a long rope, which the enemy might engage with her bows and so draw the mines into her sides. It is known that no vessel has ever been mined by these methods. Another development of German cunning in this direction, took the form of passing a long tube through a partially submerged mine, so that an enemy ship might mistake it for a periscope and ram it. It is said that this ruse was first discovered by some fishermen, who, sighting one of these decoys, really thought it was a submarine and proceeded unconsciously to put into operation certain instructions that were actually given to Russian naval officers in 1904-5. They tied a noose in a long rope, lassoed the "periscope," and towed their prize into port!

It is not known exactly when Germany first began to use submarines for mine-laying, but it is believed that at least a hundred vessels of this type have been passed into service, of which from 40 to 60 per cent have been accounted for in one way or another. The majority of them are identified by the letters "U. C.," and a number, and of these the U. C. 5, exhibited here in connection with the Liberty Loan, was a fair sample.

She belonged, however, to the earlier and smaller groups, and was fitted to carry only 12 mines. Later U. C. boats have nine tubes (where the U. C. 5 had only six) with two mines in each; and there is also in service a score or so of submarines which, originally built for ordinary U-boat work, have since been converted into mine-layers. These retain their original armament, but carry only one torpedo for each tube, instead of the usual two or three, the saving in weight being absorbed by the shipment of 36 mines with the necessary dropping gear. It is worth recalling that the first modern submarine built for mine-laying was the Russian *Krab*, launched at Nikolaieff on the Black Sea in 1912. Displacing 402 tons, this vessel was armed with two torpedo tubes, and, it is said, could carry 60 mines. The number in any case must depend upon the weight of the individual mine and the extent to which other characteristics are sacrificed, as well as upon the size of the vessel.

Within the last year or so the Germans have greatly extended their preparations for laying mines from surface ships. Only two regular sea-going mine-layers existed at the outbreak of war in the German fleet. These were the *Albatross* and *Nautilus*, built in 1906-7, displacing about 2000 tons, and designed to carry 400 mines each. The *Albatross* was driven ashore by a Russian squadron in July, 1915, was subsequently salvaged, and is now interned in Sweden. It is known, however, that a large number of the older small cruisers have been adapted for mine-laying, while the same purpose is borne in mind in the construction of all new ships. As a typical instance there is the new *Emden* class, at least six in number, which, on a tonnage of 5400, combine an armament of ten 5.9-inch guns and a speed of 28 knots, with a supply of 120 mines.

Much more remarkable, however, is a new group of mine-laying cruisers, believed to be six in number, of which four are named *Bremse*, *Brummer*, *Natter* and *Skorpion*. These vessels are understood to displace no more than 4000 tons, and to carry the relatively heavy armament of four 5.9-inch and eight 4.1-inch guns with a speed of 35 knots. On top of these striking characteristics, each ship is to carry a large supply of mines. The place of these vessels in the German scheme of things is not clear. They may be intended to act as a rear-guard and lay down a barrage between the German and a hostile fleet if the two should ever meet again at sea; they could impose infinite and monotonous labor on the British mine-sweeping flotillas by dashing out into the North Sea and scattering their mines indiscriminately. Or they may be intended to run the gauntlet of the North Sea blockade and deposit their spawn off the American coast or in the probable track of American transports. The enterprise of the Germans in this direction is shown by the career of the recently returned raider *Wolf*, which not only sowed mine fields at various places between South Africa and the Far East, but actually fitted out the captured steamer *Turritella*, as an auxiliary mine-layer. The latter was soon overhauled, and was scuttled by her German prize crew to avoid capture.

It is clear from these and other facts that the Germans are developing their mine-laying policy for all it is worth, and what this means to those lying within easy reach of their bases is evident from the official statement that during 1917 1000 mine-sweepers were constantly employed round the British coasts, 3000 square miles being covered every day and a total of 4600 mines swept up.—*Scientific American*, 6/4.

GREAT BRITAIN

HOSPITAL SHIPS FOR MESOPOTAMIA.—Two motor hospital ships, *H. M. 5* and *H. M. 6*, which had been constructed in Messrs. Burn and Co.'s shipyard at Howrah, were recently launched on the Hooghly. These ships, which are intended for Mesopotamia, have been specially designed to facilitate the navigation of the Tigris from Basra to Bagdad, which is exceptionally difficult. The original designs were made by the Royal

Indian Marine, Bombay, while the medical arrangements and details have been designed and carried out by Brevet Lieutenant Colonel Carter, I. M. S. There was no public ceremony.—*United Service Gazette*, 7/3.

"CHARYBDIS" CONVERTED FOR MERCANTILE MARINE.—The former British cruiser *Charybdis*, is now serving the trade between New York and Bermuda, having replaced the steamer *Casapedia*. A chill room for the carrying of green vegetables has been installed aboard the *Charybdis*. Main deck accommodation has been installed for 41 passengers with 11 settee berths and lower deck accommodation for 32 passengers. There is no special provision for second-class traffic. The ship is insured for £100,000, and was lent by the British Government to the local authorities of Bermuda for the period of the war. The transformation of the *Charybdis* from a man-of-war to a merchantman was carried out by the Morse Dry Dock and Repair Co., South Brooklyn, New York.—*Shipping*, 16/3.

TWO DUTCH STEAMSHIPS AND ONE RUSSIAN ARE SEIZED AT HALIFAX.—Halifax, Nova Scotia, Tuesday.—Three steamships, two Dutch and one Russian, have been seized by the naval authorities here, and will before long be engaged in the British merchant marine service. The Dutch steamships, which are about 2000 tons net each, have been in Bedford basin for some time, while the Russian steamship was towed into this port on Sunday minus a propeller blade.

When the officers went on board the Dutch steamships there was no protest. The Dutch ensign was not flying, and the British flag will not be raised until the Dutch crews leave for Holland. On board the Russian ship the Russian flag was lowered, but the British flag was not raised.—*N. Y. Herald*, 3/27.

ADMIRAL SIR JOHN JELlicoe REMOVED AT OWN REQUEST.—That Admiral Sir John Jellicoe was removed from command of the Grand fleet at his own request, with the express object of dealing with the submarine menace, was a statement made by Mr. Asquith in the British Parliament on March 20, during the debate over Sir Eric Geddes' statement as to shipping conditions. The general impression had been that Admiral Jellicoe was removed from command of the Grand fleet owing to dissatisfaction over its inactivities.—*A. and N. Journal*, 23/3.

ALL LONDON WAR TALK CENTERS ABOUT SHIPS.—London's chief topic of interest in the war varies from month to month, almost from day to day. At intervals it is the fighting on this or that front, then peace terms, politics, air raids, food, manpower, American progress, Bolshevism, German unrest, Russian decadence, or any one of half a dozen other subjects is for a time uppermost in the public mind. Such inconstancy—for the changes are not always in harmony with the actual public importance of the events which inspire them—is common to all belligerent peoples; but in England there is one topic which runs through the threads of public interest like the master color of some intricate Oriental design—shipping. Every thread of war talk leads back to that one subject.

If it is food, the reference is early and obvious; but to take a broader subject, talk of Russia just as surely leads to it through the consideration that the ultimate fate of the Russian democracies is not going to be determined by treaties separately imposed upon them, but by the terms of a general peace, and that Germany will never be brought to terms until the shipping war has been decided beyond all doubt.

The new deliverance of Italy from Austria depends on shipping; the Italian Army can do nothing without it. If Greece is to be kept out of the toils of Mittel-Europa there must be ships to feed her and her defenders. If Switzerland is to be kept economically independent and

saved from the same threat of military absorption, ships must carry her food across the ocean and the other European neutrals, all in various degrees living under the same menace, must have each a share of the free tonnage of the world. No matter where one's thoughts may turn, to the immediate problems here at home, or to the fate of foreign millions, soon or late the conclusion comes—"and that depends on shipping."

And America? Columbia is fast becoming as closely associated with the thought of ships as ever was Britannia. In the English mind America is no longer a self-sufficient continent. For all the purposes of the war America is an island, a distinct island, in some respects a good deal more of an island than Britain is, thanks to the almost hourly ferry boat service of the channel. Even the essential difference between the food supply of Columbia and that of her sister, which in these days of strict rationing, ought, indeed, to keep in mind our insular conditions, is being put out of the reckoning by the many reports of the sacrifices and successes of your voluntary system of food saving. And needless to say, this vision of island Americans putting themselves on rations for the good of the common cause—this quite ungeographical, but not unreal view of America, as if it were an older and nearer and wealthier and more populous Australia, one part British and the other British "and then some," the growth of this sense of a material and spiritual identity is to-day so striking that to-morrow it may be more potent for good or evil than any political tie.

Consider this. When Englishmen speak of America now they speak of ships. Thus shipping, besides being the first essential stage in the journey to the common good of victory, is the keystone of Anglo-American friendship. When we hear reports of greater numbers of American troops in France we think, indeed, of the high ideals that brought them across the ocean and of the need that France and England has of them after their heavy sacrifice of life, but we think of the ships that brought them over and wonder where they were built and when. Some time after the sinking of the *Tuscania* a paragraph from the American press was passed around in a shipping office here. This is what it said: "The sinking of the *Tuscania* revealed the fact that the United States was borrowing British tonnage for the transportation of troops to Europe."

One cannot report in writing much more of the comment it caused, than to declare that the smile was always friendly. Probably the paragraph caused as many smiles in Baltimore as it did in London. Yet among those in England unfamiliar with the maritime resources of other nations, it had been just as readily taken for granted that America had all the ships she needed for herself as it was by the ingenuous news writer.

Taking the nation in its widest sense, England knows that scores of her ships are at the service of the Allies, and is proud of it; but England knows also that to take 5,000,000 or 6,000,000 men away from her for the army and millions more for munitions and army supplies, and then to ask her shipbuilders to keep pace with the dozen or more big British ships claimed weekly by the submarine pirates, and with the increasing demand for tonnage among allies and neutrals, not to mention the constantly growing needs of her own armies in France, Greece, Egypt, Palestine, Mesopotamia and India, is to ask too much.

Neither the British nor the American figures for shipbuilding in the first two months of the year were satisfactory. Extraordinary measures are being taken here to stimulate construction, but, at best, the resources of the country, severely taxed by three and a half years of war, are limited. America's output is limited only by the determination and skill with which the problem is tackled, and these are qualities held to be peculiarly American.

The maximum hope of American shipbuilding officials for this year's construction is given as 4,800,000 tons, and to judge by other figures quoted in the same report, these are dead-weight tons. This would give less than 3,000,000 gross tonnage. This is little more than England is

counting upon being able to produce with all her handicap of manpower and material, and the extraordinary demands that may be made upon her any day as the result of naval action.

It is going to be a race, then—a race between the shipbuilders of the two countries for the place of honor in contributing to those resources of the Allies which, together with the anti-submarine warfare in which Great Britain must necessarily maintain the lead, are going to prove the decisive factor in winning the shipping war. And when that issue is put beyond all doubt, even in the mind of the enemy, there will be little heart in Germany's defence of the western front and victory will be in sight.—*Baltimore Sun*, 7/4.

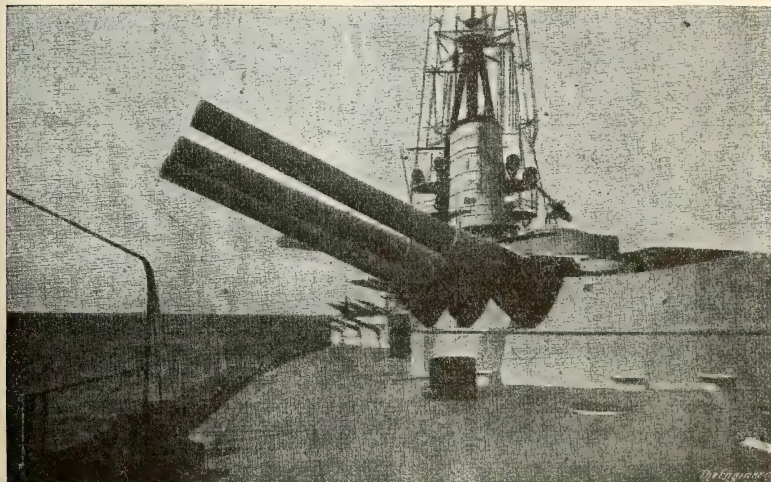
GRAVITY OF THE SHIPPING SITUATION.—There was a sharp contrast in the statement on the Navy Estimates made by the First Lord of the Admiralty on Tuesday in the House of Commons. The work of the navy called for the highest commendation; that of the men engaged in mercantile shipbuilding was shown to be unsatisfactory. In the one case, there were shadows in the picture drawn; in the other, the sunshine was rarely present. For the present we do not propose to follow Sir Eric Geddes in his review of sea operations, excepting only as they affect the submarine warfare, because that is directly associated with the main need of new shipping to ensure early success in our sea campaign. The German submarine is being defeated, but again we must assert the view that fuller information, even if it were not up to date, would have a heartening effect on the people. Certainly in the waters around the British Isles splendid results are being achieved by the anti-submarine operations of the British and American fleets, and we can accept the assurance of the First Lord, corroborated by Mr. Asquith, that, to use the latter's words, "the best brains, the most developed technical knowledge, the highest scientific reservoir of research and the highest practical experience" are being devoted to this problem. In the Mediterranean, however, there does not seem to have been the same co-ordination of effort, and the losses of merchant ships in this area—30 per cent of the total—are disproportionate to the tonnage navigating the waters. This lack of co-ordination is inherent in a war where three or four nations are allied, as there is not the same unity of control. Thus, the naval command in the Mediterranean rests with the French, and in the Adriatic with the Italians, British naval forces acting respectively under the French and Italian Admirals. We are glad to note that an allied naval council has got to work, and that Sir Eric Geddes was at their meeting at Rome. The result is that the British anti-submarine proposals put forward by our commander-in-chief in the Mediterranean have been accepted, and there is reason to hope that the same success against the German under-water attack, which is increasingly effective in the British area, will have a salutary influence in reducing losses in the Mediterranean. Another satisfactory feature is that the Greek Navy is soon to come into operations, as this navy is one of the best of those belonging to secondary or tertiary powers incidentally, also, satisfaction may be expressed with the fact that the Brazilian Navy will soon augment the allied forces in European waters, but whether in the Mediterranean or North Sea has not been disclosed. The only other point on which reference to naval operations need be made is the "tip-and-run" offensive operations of the German torpedo craft. These are inevitable, and up to a certain extent negligible. Viscount Jellicoe, in a recent speech, asked the people, when they were looking at small maps, to realize that the presence of a ship in the vast waters of the North Sea corresponded to a pin point in such maps as we are accustomed to consult. This alone shows how easy it is for a daring German commander to make an occasional incursion, with surface craft, into open seas, and, on dark nights, even into the Straits of Dover.—*Engineering*, 8/3.

SEA CONTROL IN EASTERN LITTORAL.—Besides the Black Sea and the Baltic, and in a sense more important than either, is the question of the Adriatic. Whoever controls the eastern littoral of that sea controls the whole of it. That is the lesson of the last two years which ought to have been apparent from the map even before the war was opened. It is hardly an exaggeration to say that the whole of the Dalmatian coast is one vast, deep, land-locked and protected harbor. If Trieste is the "spear point" of the Germans, Dalmatia is still more their guarantee of power in the Mediterranean, and we may be certain that any terms suggested for the west will not include a compromise upon this essential littoral. It will be won or lost by the fortune of the war. So far that fortune has here, even more than elsewhere, and especially recently, strongly favored our enemies.

No matter what concessions remain in the west, if the Central Powers retain their present position in the Balkans, and therefore upon the Dalmatian coast, they own the Adriatic, and through the Adriatic and the Bosphorus they are the masters of the eastern Mediterranean. Europe has something to say to that quite apart from our own interests in the matter, and for the future of Italy in particular the nature of the settlement is all-important. But our own interests alone are sufficient to define our position too clearly for any hope of compromise.—*Land and Water*, 21/3.

ITALY

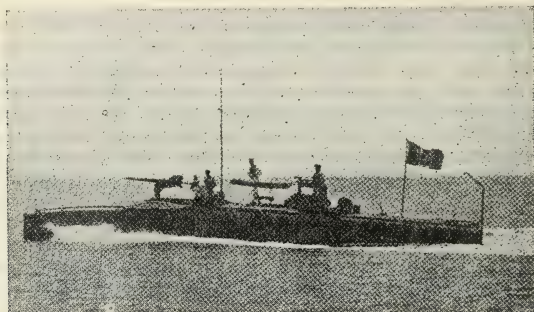
THE ITALIAN BATTLE FLEET.—The declaration of war against Austria-Hungary in May, 1915, found the Italian Navy ready and formidable as an instrument of combat, but ill-prepared in some respects to deal with



A TRIPLE GUN TURRET.

the strategical problems of a purely Adriatic campaign. The coast-line of Italy in that sea is more than 650 nautical miles in length, yet the only harbors at all suitable for naval purposes are Venice and Brindisi. The first-named, however, has been made virtually inaccessible by the numerous mine-fields which it was necessary to plant in order to guard this vitally important area against enemy attack, and the Italian fleet is thus reduced to a single base on the whole coast.

The adverse strategical conditions under which it has to fight were lucidly explained by Rear Admiral Mazzinghi in the *Navy League Annual* of 1915-16. The western coast, he pointed out, is for the most part very low, and therefore does not lend itself to fortification, except by costly artificial works. Not only is there an almost complete absence of gulfs and bays, but the conditions both of land and water are most unfavorable to the creation of naval ports. The waters are shallow, and silt up so rapidly that a fairway can be kept open only by continual dredging. The bed of the sea, composed as it is of sand or a kind of argillaceous conglomerate, enables hostile submarines to remain for long periods in ambush, without risk of injury. "The wash of the currents," says Ad-



No. 2



No. 3

ITALIAN SUBMARINE CHASERS EQUIPPED WITH 400-HORSEPOWER MOTOR, AND WHICH MAKE 26 KNOTS.

miral Mazzinghi, "brings to our coasts all that which the opposite shore has given up, from which reason under-water drifting mines, or mines which have broken their moorings, come sooner or later according to the season and the winds, but come without fail upon our shores. Even the sun is strategically against us. If, for instance, a naval force left the western coast, in order not to be seen, by night, with the object of making an attack at dawn—the hour most propitious for surprises—on the eastern coast, the attackers would have the sun in their eyes, while those who might be watching or moving on the Dalmatian coast would have the sun behind them."

The Austrians have none of these difficulties to contend with. At many points along their coast the mountains jut out into the sea, and deep gulfs lead between these lofty promontories into almost land-locked bays which can only be approached through narrow and easily defended channels. Furthermore, "a screen of islands extends along the whole of the Dalmatian coast, forming an intricate network of canals which render an approach to the coast extremely dangerous in war time, a mass of ambushes and traps—a screen behind which, by interior passages, the fleet of the adversary can securely and secretly separate into units. The sea which laps this coast has a bottom of a rocky nature and usually very deep, so that those of our submarines which desire to operate in that quarter have to keep up an incessant motion while submerged, with very great discomfort to the crew, consumption of fuel, and waste of material."

In face of the preponderance in heavy ships which the Allies have at their disposal in or near the Adriatic, it was scarcely to be expected that the Austro-Hungarian fleet would choose to accept a pitched battle. Instead, their tactics have been confined almost entirely to raids by light forces against the unprotected Italian coast and the Allies' lines of communication in the lower Adriatic. Against such tactics heavy armored ships are of no avail. The vessels of the greatest value in these circumstances are light cruisers and destroyers, and unfortunately the Italian Navy was inadequately supplied with vessels of both types. A number of modern destroyers and old torpedo gunboats have been fitted up as mine-layers, a branch of naval work in which the Italians have proved themselves remarkably efficient. The submarine flotilla includes about 30 boats, coastal and sea-going, the majority of which are of the well-known *Fiat-Laurenti* type, which has been adopted in many foreign navies. British and French officers who have served in the Adriatic theater have returned with the most favorable impressions of the quality of Italian naval material. The design of every ship is obviously the result of a careful study of contemporary principles in strategy and tactics, and betrays a certain independence of view not commonly met with in foreign naval circles.—*Engineer*, 22/3.

JAPAN

JAPANESE NAVAL EXPANSION.—Considering the difficulty of obtaining steel and the by no means flourishing condition of her finances, Japan has managed to turn out a surprisingly large amount of naval construction during the war. Since August, 1914, she has completed three battleships and three battle-cruisers, and a whole flotilla of destroyers, in addition to several special service vessels. At the present moment, according to advices from Tokyo, the Imperial Diet is considering a new program which will involve a sum of £30,054,000, to be spread over a period of six years, the vessels projected being two battle-cruisers, three light cruisers, 11 large and 16 medium destroyers, 48 submarines, and six auxiliaries. This, however, is only an interim program, and, if financial circumstances permit, a much larger scheme will be introduced in 1921, aiming at the realization of the so-called "eight-eight" system—that is to say, the creation of three squadrons, each consisting of eight battleships and eight battle-cruisers, or a total of 48 capital ships. It is not quite clear whether all these vessels are to be dreadnoughts, for under the official Japanese classification the term "battleship" covers all effective armored ships other than cruisers and coast defenders, while several armored cruisers of relatively light armament are classed with the battle-cruisers. In these two categories there are now 22 ships completed or under construction, so that even if all the existing vessels are to be included in the contemplated establishment of 48 units, no fewer than 16 new ships must be built to attain this figure, and the sum required for their construction will hardly be less than £50,000,000. Two battle-cruisers, it is stated,

are to be laid down almost at once, the contracts having been signed. The government's plan will involve a heavy increase in the naval budget, which will be met partly from surplus funds in the treasury, but mainly by increased taxation. Income-tax is to be raised from 10 to 50 per cent, in proportion to the amount, and will be levied on all incomes above £50. There is to be an almost general increase in other dues, together with a new tax on war profits. Without the assurance of popular support, it is doubtful whether the authorities would venture to impose this new burden on the nation, and the fact that the suggested measures are, on the whole, approved by the press, indicates the willingness of the people of Japan to make further sacrifices for the sake of securing the maintenance of that naval power to which they have always and rightly attached so much value.

All the vessels of the new program are presumably to be constructed in Japanese yards. The national shipbuilding industry has made remarkable progress in the past few years, and there are now two government and two private establishments capable of building warships of the largest size. The state dockyard at Kure laid down in 1905 the *Tsukuba*, which was the first large fighting ship to be built and completely equipped in Japan. This vessel was unfortunately destroyed by an internal explosion last year. Two larger ships, the *Aki* and *Satsuma*, were also begun in 1905, respectively at Kure and Yokosuka, the machinery being ordered abroad. The first all-big-gun battleship, *Kawachi*, was laid down at Kure in 1909, and equipped with turbine engines built by the Kawasaki firm. The last large Japanese warship to be built abroad was the battle-cruiser *Kongo*, which was launched by Vickers Limited in 1912. Three further vessels of this type have since been constructed in Japan. The heaviest ship which has so far been built and completed in that country is the *Fu-So*, of 30,600 tons, which made her trials in 1915. She is one of the most powerful battleships now afloat, having a main battery of twelve 14-inch guns, very good armor protection, and a speed of 22.5 knots. Three later units of the *Fu-So* class have since been completed. The principal vessel now under construction is the battleship *Nagato*, to displace 32,000 tons and be armed with ten or twelve 16-inch guns. Her designed speed is 24 knots. It will be seen, therefore, that Japan is now in a position to turn out warships of a size and power equal to those of any other country, and has completely emancipated herself from her former dependence on foreign industry. Until very recently her ships were armed almost exclusively with guns of British manufacture. But the state arsenal at Kure now builds naval ordnance of every type, and has already supplied the complete armament for the *Fu-So* and the three later ships of the *Kongo* class. It is understood that armor plates are still purchased abroad, though in the near future this material will be supplied by the home industry.

Rapid as was the growth of Germany's sea power in the last generation, the development of the Japanese Navy in the corresponding period was, in many respects, still more remarkable, in view of her much smaller resources. Prior to 1866, Japan possessed not a single war vessel worthy of the name. In that year she purchased the armored ram *Stonewall Jackson*—subsequently named the *Adzuma*—from the United States, and soon afterwards placed contracts in England for several sea-going armored vessels. As early as 1865, a dockyard was laid out at Yokosuka, and equipped with facilities for constructing and repairing ships of war. In connection with this yard a school was started for the technical training of the workmen, and a few years later the entire establishment was under native management. A number of officers had previously been sent from Tokyo to study the shipbuilding and engineering methods in vogue in the principal European dockyards. At Yokosuka in the early 'eighties the gunboat *Seiki* was launched, she being the first modern warship ever built in the country. The hull, machinery, and fittings were all constructed in the yard, and only the armament was purchased abroad. This little vessel,

of 810 tons and 11 knots speed, proved most successful in every way, and in 1880 she made a cruise to England, *via* the Suez Canal. From its modest beginning in 1865, the yard at Yokosuka has grown into a splendid establishment, which in size and equipment comes within measurable distance of the finest naval arsenals in Europe. Of the six building slips, only one is capable of taking the largest vessels, but two other dreadnought berths and a large dry dock are under construction. In 1914, the employees at this dockyard numbered 8000. The Kure dockyard is somewhat smaller, but the equipment is thoroughly up to date. It has three slips and one dry dock, in which last the *Fu-So* was built. Third in importance is the yard at Sassebo, which has several large docks and slipways, and specializes in the construction of light cruisers. There are six smaller yards which undertake repairs and a limited amount of small construction. The principal private establishments are the Kawasaki, at Kobe, and the Mitsubishi, at Nagasaki. Vessels of the largest dimensions have been built, engined, and completely fitted out at both yards, which are well supplied with docks, slipways, etc. The universal demand for new tonnage arising out of the war has led to a great extension of the shipbuilding industry in Japan. Existing yards have been enlarged, and new ones created by private enterprise. But all marine work, whether naval or mercantile, has been seriously retarded by the dearth of steel, and at the present time negotiations are proceeding with the United States Government to relieve this situation, Japan having offered to hand over a portion of her mercantile marine in exchange for the structural material she urgently requires. It is interesting to learn, from the Imperial Ministry of Marine, that several of the fine Japanese destroyers which now form part of the allied naval forces in the Mediterranean have been built in Japan during the war. The publication of the new building program to which we have referred suggests that the Japanese Government intends to adopt a vigorous policy of naval development as soon as conditions again become normal. In the far east, at all events, the idea of universal disarmament at the conclusion of this war does not appear to find favor.—*Engineer*, 8/3.

JAPAN NOT CONSIDERING INTERVENTION IN SIBERIA.—Premier Terauchi told the Japanese House of Peers on March 28, that the government is not considering intervention in Siberia, where enemy war prisoners are no real menace, according to dispatches from Tokyo.—*Oswego Palladium*, 23/3.

SOVIETS MAKE INQUIRIES IN REGARD TO JAPAN'S PLANS.—The Soviet commissaries recently directed Foreign Minister Tchicherin to make inquiries of America, England and Japan, regarding Japanese mobilization to occupy Siberia.

The military commission, headed by War Minister Trotsky, is considering plans for defence.—*Oswego Palladium*, 23/3.

JAPAN'S MINISTER DENIES AGGRESSIVE POLICY IN SIBERIA.—The statement made by Foreign Minister Motono in addressing a joint session of Parliament to-day, that in the event Japan is compelled to send troops into Siberia there is no intention whatever of treating Russia as an enemy, and that Japan will never adopt an aggressive policy, such as Germany is pursuing in European Russia, has excited especial interest.

The Ozaki opposition has criticized the government for not making a similar declaration before, when Russia was at a loss to know what to do. It is believed that Russians assisting Germans in Siberia should be regarded as enemies.

Viscount Yasuya Uchida, the Japanese Ambassador to Russia, who has arrived here, is quoted as saying that he doubts that Germany intends to attack India.—*N. Y. Herald*, 2/4.

NETHERLANDS

NEW DUTCH CRUISERS.—Two warships of a very interesting type are now under construction for the Dutch Government at Amsterdam and Flushing respectively. They are the protected cruisers *A* and *B*, which were laid down in May, 1916, and are due for delivery in the current year. The plans were prepared by the Krupp-Germania yard at Kiel, which is also supplying part of the material, technical supervision, and a number of skilled workmen. The same firm is likewise building the machinery and boilers for both these vessels, which will, therefore, be largely of German origin. Intended for service in the Dutch colonies, the cruisers will have the unusually high displacement of 7100 tons, the other dimensions being as follows: Length on water-line, 502 feet; beam, 52½ feet; mean draft, 18 feet. There is to be a complete belt of 3-inch armor on the water-line, besides armor protection to the funnel bases, fighting positions, and guns. Each cruiser will be driven by three sets of Krupp-Germania turbines, operating three propellers, and supplied by eight boilers, probably of the Schulz-Thornycroft type. The machinery is designed to develop 65,000 shaft horsepower, equivalent to a speed of 30 knots. All the boilers are to be fired with liquid fuel, of which a quantity will be carried sufficient to give a steaming endurance of 5000 nautical miles at 12 knots. In view of the considerable displacement the armament is not heavy. It comprises ten 5.9-inch 50-caliber Krupp quick-firers, four 12-pounder semi-automatic guns for use against aircraft, four machine guns, and two broadside torpedo tubes. The 5.9-inch weapons are disposed in such a way as to give a broadside fire of seven, and an axial fire of four guns. The forecastle deck is carried right aft, giving the vessels a high freeboard, and, in spite of the fine lines, they promise to be excellent sea boats. As German yards themselves are known to be short of skilled labor and materials, it seems doubtful whether they will be able to spare the Dutch establishments much of either commodity, so that the completion of these two cruisers is likely to be delayed. Their names, it is understood, will be *Java* and *Sumatra*, and the building of a third vessel of the same type, to be named *Celebes*, is said to be under consideration. The general design has many features in common with that of the new American scout cruisers authorized in August, 1916, whose characteristics—as given in the annual report of the Bureau of Construction for 1916—are as follows: Displacement, 7100 tons; speed, 35 knots; length, 550 feet; breadth (extreme to outside of armor), 55 feet, 4 inches. Armament: Eight 6-inch guns, two 3-inch anti-aircraft guns, two twin torpedo tubes. "There high-powered machinery installations," it was added "will be protected by light, but efficient, vertical and horizontal armor."—*Engineer*, 8/3.

ALLIES SIEZE DUTCH SHIPS.—In a single day, the United States Navy crews took possession of 68 Dutch ships with a total tonnage of 470,000, that were lying in the various ports of the United States. At the same time, Great Britain took over Dutch ships with a total tonnage of 400,000. The total of 870,000 tons thus added to the shipping of the Allies is about 14 per cent of the shipping losses of the world for the year 1917.—*Scientific American*, 6/4.

GERMAN PRESS COMMENT.—The text of this statement in the *Vorwärts*, as telegraphed here, runs: "If the enemy insists on violating international law the result is that Germany must exercise the right of protection. Hitherto the Netherlands has resisted every attempt to infringe her neutrality, and it is to be expected that our neighbor will still refuse, voluntarily or involuntarily, to sacrifice one tittle of her rights. From the point of view of her own self-protection Germany can only recognize as correct the attitude of strict neutrality hitherto adopted by the Netherlands."

The *Lokalanzeiger* says: "We shall do everything in our power to protect Dutch ships lying in enemy harbors from employment by the Entente."

The use of the word "protect" in this passage is a characteristic piece of humbug. The *North-German Gazette* declares, according to a telegraphic summary, that the employment of Dutch ships by the Entente represents an advantage to the latter which cannot be compensated by any concession to Germany.—*London Times*, 18/3.

DUTCH PRESS PROTEST.—The Hague, March 16.—It is impossible for Holland to give an affirmative answer to the Entente's proposals concerning Dutch ships, says the *Nieuwe Courant*.

"It is an act of violence," it adds, "to which we are subjected by the rulers of the ocean, and nothing makes us so bitter as the attempt being made to base it on the so-called rule of international law—the antiquated Angary law—which is in nowise applicable here."

Amsterdam, March 16.—Discussing the Dutch shipping question, the *Tyjd* says:

"We shall have to acquiesce, but such rough misuse of power will not be forgotten by our people."

In an article vehemently denouncing the Allies, the *Handelsblad* says:

"We cannot think what our government will do. Will it publish a protest refusing to give its approval to piracy and leave the matter as it is, or will it make the best of a bad job and make an exchange for what will be taken away? If it is not exchanged will it request the ministers of these piratical powers to pack their trunks and depart? We should not lose much thereby. We do not know what the government will do and would not wish to advise it. At such a moment it must be left to the government's discretion to take that decision which is least harmful to the country and the people."

In the same article, however, the *Handelsblad* admits that it is unfortunately true that Holland is the only northern neutral which has done nothing to combat German submarine methods. It attributed the country's present position to the spirit which has dictated such an attitude.

The *Telegraaf* advocates acceptance of the offer of the Entente governments, adding:

"Holland's existence as a free and independent nation and the possession of its colonies are at stake. By choosing the right path the government has it in its power to maintain the liberty of the nation, or irrevocably deliver it to the mercy of Germany, which in its bid for world domination has long had envious eyes on Holland. The Dutch nation will not permit itself to be delivered over to the German junkers."—*Washington Evening Star*, 18/3.

FORTY-ONE DUTCH VESSELS SEIZED AND PUT IN AMERICAN SERVICE.—Acting upon orders from Washington, numerous naval tugs and harbor patrol vessels were taken over by a brigade of naval reserves mustered on Ellis Island. These barges proceeded to the anchorages of Dutch steamships in the port of New York, or to their berths beside piers. Forty-one Dutch steamships were boarded. No move was made to take possession of the *Nieuw Amsterdam*, which was to leave shortly for Rotterdam, Holland.

The appearance of the armed seamen on board the Dutch vessels meant that by their action fully 250,000 tons of shipping was added to the American merchant marine. Masters of steamships, who had been warned previously of the intended visit, were ready to receive the details of men. Officers commanding the reserves were politely informed the act of seizure was duly recorded in the log, where a protest was entered. None of the officers or men of the crew of any vessel boarded was molested and for the time being they will remain on board.

It was expected many of the crew on each vessel would take advantage of the invitation extended to pass formally through the immigration routine of entering the United States. One inspector of immigration went with

the navy forces to each steamship to arrange the details, compile lists of the crew, etc. Those not desirous of entering the United States as citizens, enroll in the reserve forces for duty on board the steamships or enlist in the army, will be given an opportunity to return to Holland. It was understood that hundreds of them would board the *Nieuw Amsterdam* and return at the expense of the United States Government.

The customs service was represented at the seizure by numerous inspectors, who also boarded the Dutch steamships. Several men were in the detail going on board the one passenger steamship that was seized. Only one inspector went upon each of the smaller freight steamships.

The scene on board the vessels at the seizure was in no way startling. The navy boats pulled alongside and the boarding parties were met by the masters or first officers of the vessels. The stars and stripes were raised on board many of the steamships to replace the flag of the Netherlands. No protests were made—excepting the formal protests appearing in the log of each vessel.—*N. Y. Herald*, 3/22/18.

DUTCH SHIPS SAFE IF ON SEA AT TIME OF SEIZURE ORDER.—Dutch steamships en route to the United States at the time the Dutch craft in American ports was requisitioned will not be taken over when they arrive at ports of the United States. This decision was made by the War Trade Board, which announced that inasmuch as the requisitioning had been enacted only to restore to their former activity the Dutch steamships that lay in American ports and harbors, there was no reason for taking charge of the Holland vessels that were on the seas and headed toward American ports at the time of the requisition.—*N. Y. Herald*, 2/4.

SHIPS WITHOUT SEXTANTS.—*Requisitioned Dutch Craft Stripped of Navigating Apparatus, it is Discovered.*—Requisitioned Dutch ships when taken over by American naval officers were found to have been stripped of their sextants and other valuable navigating instruments. Many had been taken by ship's officers, who were about to sail for home on the liner *Nieuw Amsterdam*, and the delay of 48 hours in the vessel's departure was said to-day to have been due to the necessity for recovering them. Some of the sextants were the personal property of the officers, who were prepared to sell them to the Navy Department.

More than 1000 members of the Dutch crews have sailed for home. They are being replaced by naval reserves and civilian crews.—*Washington Evening Star*, 30/3.

RUSSIA

THE RUSSIAN FLEET.—By Arthur Pollen.—The political and military results of the Russian surrender to Germany, and now of the German advance towards Petrograd, may have a profound influence upon the naval war. The fall of Riga in September, followed a month later by the naval occupation of that gulf, were the preliminary steps which secured the necessary line of communication before an advance on the whole front from Dvinsk northward. Without the transport facilities that an unbroken chain of sea supply could give from the German Baltic ports to a series of advanced bases on the east coast of the gulf, the difficulties in the way of the march on Petrograd would have been very great indeed, whereas with such a line of communications the thing was made comparatively simple. Before this is in print it is, therefore, highly probable that Reval will have fallen and possible that Kronstadt will have surrendered. Both are inevitable events, whether they happen soon or late, and with these surrenders the Russian fleet—if intact—must fall into German hands. For it cannot take refuge in Helsingfors, which seems to be virtually under German control already, and there seems, therefore, to be no third possibility. How will this affect the situation in the North Sea?

We have first to ask what are the constituent ships of the Russian fleet at the present moment. The first dreadnoughts of the Russian 1910 program, *Poltava*, *Sevastopol*, *Petrovsk* and *Gangoot* were all completed, fully commissioned and in a high state of war efficiency before the end of 1914. These four ships were laid down, two in July, one in August and one in October, 1911. They had been completed therefore in approximately three years. At the end of 1912 and the beginning of 1913 the four battle-cruisers, *Borodino*, *Ismail*, *Kinburn* and *Navarin* were laid down, I think, on the same ways that the four battleships had previously occupied. They were due for completion by the end of the summer of 1916, but I am unaware of any reliable information that any of the four was commissioned before the revolution of a year ago. But none of the four can be very far from completion, and if the Germans seize Petrograd they will get the Galerny and Baltic works, and all the Imperial arsenals, and will therefore have no difficulty in finishing their equipment for sea, assuming that no irreparable damage has in the meantime been done to them. Besides these capital ships there are two modern light cruisers of between 4000 and 5000 tons and with a speed of over 27 knots, *Mooraviev*, *Amursky* and *Nevelskoy*, that should have been completed, soon after war began, and there were four others displacing about 2000 tons more each, the *Svietlana*, *Grieg*, *Boatkof* and *Spiridof*, which, like the battle-cruisers, were due in 1915 and 1916, and are presumably either ready for commission or nearly ready. Hardly less important are the destroyers of the 1912 program, 36 in number, all of which I believe were at sea early in the war. The foregoing, then, dreadnoughts, battle-cruisers, light cruisers and destroyers, are the completed or nearly completed modern vessels which constitute the main assets of Russian naval force. Of the older craft the two pre-dreadnoughts, *Imperator Pavel* and *Andrei Pervosvanni*, are not without value, and two of the older class of protected cruisers, the *Admiral Makaroff* and the *Bayan* still survive. The armored cruiser *Rurik* is, in modern conditions, of very little use.

If the Germans can immediately reinforce the High Seas fleet with the four dreadnoughts, our enemy has at a stroke increased his main battle strength by at least 20 per cent in numbers and by considerably more than 25 per cent in gun-power. The four three-gunned turrets of our late ally's battleships are placed along the center line, so that the whole 12 guns can be used as a broadside over an arc of about 130 degrees. Of Germany's possible 24 battleships, 13 have a broadside fire of only eight guns; the four *Koenigs* have 10, and if the *Worth* class are finished, it is supposed that they will have eight only, but all of larger caliber. An addition of 48 guns in the line of battle, then, would be nearly equal in fire effect to the addition of six ships of the *Kaiser* class. This is manifestly a very formidable reinforcement.

If the four battle-cruisers become available, the addition to the German main scouting force is necessarily more important still. So far as we know from pre-war information, the German strength in battle-cruisers available during the war were the seven built for the German Navy and *Salamis* building for Greece. Of these *Goeben* is at Constantinople, *Lutzov* and *Salamis* (re-named *Pommern*) were lost at Jutland, and there have been persistent rumors that *Von der Tann* was sunk sometime before Jutland. That would leave the German fleet in possession of *Derfflinger* and the third ship of her class, supposed to have been named *Hindenberg*, with *Seidlitz* and *Moltke*. Both of the latter carry only 11-inch guns, though with a possible broadside of 10 at a small arc. The addition of the four *Borodinos*, then, would add an artillery strength much greater relatively than the *Gangoots* would add in the case of the battleships. The only disadvantage of the Russian battle-cruisers is that their speed, namely 26½ knots, is inferior to that of the ships which von Hipper commanded at Jutland. It is quite unnecessary to dwell at length on the value of light cruisers and modern destroyers. The importance of additional light forces

is immense in the phase of war now going forward in the North and Narrow seas, and were there to be a fleet action it would be greater still.

When Riga fell, I wrote an article in the *New York Tribune* pointing out that, if there were the faintest chance of the Russian ships being surrendered to Germany an entirely new value would be given to the help that the American battle fleet could afford in northern waters. It has been a constant matter of comment that the public has heard of no such concentration of allied naval battle strength in the North Sea as has taken place on land, in the case of the military forces. There were two obvious reasons against such a concentration being made. First, it was unnecessary so long as the British fleet possessed the immense preponderance that has existed since the beginning of the war. Secondly, while the co-operation of an English and a non-English speaking naval force was feasible in such operations as took place off Gallipoli in the spring of 1915, there would be enormous difficulties in securing a similar co-operation in the case of fleets maneuvering at sea. Especially would this be the case when ships are for more than half their time at sea working in close order and in the darkness. The secret of successful naval tactics is to be found in bringing the means of communication to perfection. The difficulties that have stood in the way of an admiral making himself promptly understood—and obeyed—by all the vessels under his command is the explanation of so many naval actions having proved inconclusive in the past. It was perhaps the greatest of all Nelson's triumphs that he surmounted this difficulty as it never had been surmounted before. And he did it less by the invention of the more intelligible signals than by making signals so largely unnecessary. With every captain knowing precisely what was in the admiral's mind, the most effective co-operation of every unit was generally secured without further ado. And as we know from the Jutland dispatch, the co-operation with the light cruiser squadrons with the battle-cruisers on that eventful day was practically perfect, just because it was instinctive. Again and again the commander-in-chief's wishes were anticipated by his rear admirals and commodores, because long and intimate intercourse had made his wishes in any set of circumstances easily divined. Now mutual understanding of this kind might, indeed, ultimately be reached between a British admiral and a division of French or Italian warships, but it could only be obtained after long and difficult training. If then it has not been attempted to incorporate considerable French or Italian units in the British battle and cruiser fleets, it may be chiefly because the situation did not make it necessary, and there seemed no likelihood of it becoming necessary—so that the difficulties of securing homogeneity of signals, and so forth, did not in fact even have to be faced.

But should the Germans gain the immediate reinforcement of the Russian battleships, with the prospect at a later date of being able to add four battle-cruisers as well, a position that a year ago was entirely unexpected will have arisen, and new naval dispositions will become imperative. There can be little doubt that this will take the form of American co-operation on the greatest scale. Fortunately in this case the difficulties presented by French or Italian co-operation would be absent. The differences in tactical methods and in the formulæ of signals and of their significance are real—but unity of language would soon bring about unity of method.

The United States Navy, as has often been pointed out in these columns, could reinforce us immediately with three divisions of four ships, with a reserve of two, if not three, to replace any unit temporarily under repair. They are magnificent ships, so exceptionally armed, manned and officered, as to promise a high standard of war efficiency after the briefest possible period of special training in war conditions. And, let it be added that, were Admiral Mayo ordered to join Sir David Beatty with the whole of his fleet, it would be a decision that would give infinite satisfaction to the whole of the American Navy. Against a possible addition to the German fleet of eight ships, there would, therefore, be a corresponding

increase of the allied main fleet by no fewer than 14. And, once more, we must make the point that the American ships are more powerfully gunned than the Russians, so that while restoring the old relative strength in numbers, the relative gun superiority would also be maintained.

It must not be assumed that we have to look upon the incorporation of the Russian ships with the German Navy as a certainty. Some patriotic officers, if any survive, may succeed in destroying them first, and if they are not destroyed, they may be in such ill repair that it would take a long time to make the four battleships seaworthy and fit for action. In the case of the battle-cruisers, the delay in their being fit for use might be greater still. On all these points the government has no doubt the latest and best information. There may be no danger at all; it may be a danger which cannot materialize for many months. The only satisfactory feature of the situation is that, if it does materialize, the American fleet alone can restore the balance.—*Land and Water*, 28/2.

OCCUPATION OF ODESSA.—The occupation of Odessa by the enemy—an immediate and necessary consequence of the Rumanian peace—does more than convert the Black Sea into a German lake. It also puts a part of the Russian fleet into German hands and promises the complete control of that fleet in the near future. When the ice melts in the Baltic we shall have the enemy reinforced upon the north and upon the south with nearly every unit of the Russian Navy, subject only to such destruction as calculated measures (or more likely neglect) may have worked.

One of the effects of the position in the Black Sea will be that the handing over of Georgia to Turkish garrisons can be fully supported by the Central Powers, and further, that the greater part of the oil supply of the old world is now in the enemy's hands. Whether the granary of southern Russia is in a condition to supply wheat this year to the enemy in any sufficient quantity, and, if it is, whether the condition of communications will permit of any great transports, may be doubted, but the position for next year is secure.

Here, therefore, as in every other point upon the board, the issue of the struggle in the west is decisive. If a victory under arms in the west is denied us the enemy has won the war, and our immediate future will be a preparation for the next struggle under conditions far less favorable.—*Land and Water*, 21/3.

SPAIN

SPANISH SHIPS KEPT OFF SEA BY HUNS, WASHINGTON FEARS.—Official confirmation of reports that Spanish ships about to leave for the United States had been held up has led to the suspicion that Germany has made demands upon the Spanish Government with a view to preventing the carrying out of the trade agreement recently made with this country.

State Department officials said that no official advices had been received indicating that the German Government had threatened to blockade Spanish ports with submarines, if an attempt were made to carry out the agreement. Señor Riano, the Spanish Ambassador, also said that he had no information from his government on the subject.

Germany, it is assumed, will spare no efforts to prevent the manufacture in Spain of supplies for the American and allied armies in France, in return for which Spain was to receive certain raw materials from the United States.

It is known that conditions in some of the industrial districts in Spain are serious. Spanish ships were held in American ports for so long, while negotiations with the Spanish Government were in progress that the surplus stock of cotton was depleted. Many of the factories in the industrial districts will be obliged to close down if shipments from the United States are longer delayed.

A submarine patrol at Gibraltar by the Germans could effectively shut off Spanish commerce, forcing Spain to suspend its commerce or arm its vessels for protection against submarine attack.—*N. Y. Herald*, 8/4.

TEN VESSELS HELD IN SPANISH PORTS BY U-BOAT MENACE.—Ten large transatlantic steamships cancelled their trips to America and were lying idle in various harbors of Spain on account of the submarine menace. Thousands of tons of freight was lying on the piers at Cadiz, Barcelona and Corunna awaiting cargo space. Heavy losses were being sustained in consequence.

The government received a great number of telegrams protesting against the blockade and asking re-establishment of commerce with America.—*N. Y. Herald*, 1/4.

GERMANY GIVES FREEDOM OF SEAS TO SPANISH SHIPS.—After lengthy negotiations between Spain and Germany, it is believed that transatlantic voyages by Spanish ships will be resumed. About 1000 passengers and more than 2000 sacks of mail are awaiting departure. It is reported that Germany will permit the mail and passengers to start, but has forbidden the transport of merchandise.—*N. Y. Herald*, 4/4.

FEARS SEIZURE OF SHIPS BY UNITED STATES.—Apparently fearing the United States would requisition her ships and that Germany would torpedo them, the Spanish Government has recently kept Spanish vessels in home ports. It was reported recently that these vessels will be released soon, presumably as a result of assurances that the United States does not intend to seize them.—*N. Y. Herald*, 8/4

SCANDINAVIA, ETC.

COAST-DEFENCE BATTLESHIPS.—Some very powerful little vessels have been, or shortly will be, incorporated in the lesser navies of northern Europe. The *Sverige* has already been commissioned in Sweden, a sister-ship, *Drottning Victoria*, is reaching completion, and a third unit of the class *Gustav V*, will soon be launched at Malmö. It is not known whether the two coast defence ships *Bjoergvin* and *Nidaros*, which were laid down for the Norwegian Government, have yet been delivered, but both were put afloat in 1914. Denmark has lately completed the *Niels Juel* for coast service, and the Dutch Government is said to be contemplating the construction of two improved editions of the *Zeven Provinciën* immediately after the war. The following table presents the main characteristics of the most modern coast defence armored ships in European service:

	Sweden	Holland	Norway	Denmark
	Sverige	Zeven Provin- cien	Bjoergvin	Niels Juel
Length, feet	392	333	290	295½
Beam, feet	62	56	55½	53
Draft, feet	20½	20½	16½	15½
Displacement, tons.....	6,800	6530	4852	3900
Designed H. P.....	20,000	8500	4500	5500
Speed, knots.....	22.5	16	15	15.8
Armor—Belt	8-in.	6-in.	7-in.	7-in.
Turrets.....	8-in.	10-in.	8-in.	7-in.
Armament.....	4 11-in., 45 cal. 8 6-in., 50 cal. 10 12-pounders 2 torpedo tubes	2 11-in., 42 cal. 4 5.9-in. 40 cal. 10 12-pounders (?) torpedo tubes	2 9.4-in., 40 cal. 4 6-in., 50 cal. 6 4-in. 2 torpedo tubes	2 12-in., 50 cal. 10 4.7 in., 50 cal. 2 6-pounders 4 torpedo tubes
Weight of broadside fire	3540 lbs.	1370 lbs.	1000 lbs.	2248 lbs.

The above details show that vessels of very moderate size may be given a considerable degree of fighting power. Considering her limited tonnage the *Sverige*, in particular, attracts attention by reason of her high speed and formidable battery, coupled with fairly good protection. She draws at least 4 feet of water more than the earlier armored ships of the Swedish fleet. The Dutch vessel, *Zeven Provinciën*, though but little smaller, is inferior in almost every respect, but she has a much greater coal capacity. The *Niels Juel*, the smallest of the above group, has a surprisingly powerful armament; indeed, in proportion to her displacement she is probably the most heavily armed vessel afloat.—*Engineer*, 15/2.

UNITED STATES

LAUNCHING OF MINE-SWEEPER.—The *Finch*, a steel mine-sweeper, was launched at the Standard Shipbuilding Yard on Shooters Island. The *Finch* is 180 feet over all, 22 feet beam, will draw 10 feet of water and will have a speed of 12 knots per hour.—*Nautical Gazette*, 4/4.

MARE ISLAND MAKES RECORD ON DESTROYER "TAYLOR."—Mare Island made a record on the destroyer *Taylor*, which was launched on February 14, 66 per cent complete, within four months after the keel was laid. The pre-war records for this amount of work on a destroyer averaged about 24 months and the speed with which the *Taylor* was made ready made a record not only for navy yard construction but for private work. As a result of the excellent showing made by Mare Island, the secretary has announced that the naval station will be given several more contracts for destroyer work.—*Naval Monthly*, April.

"IRIS" TO BE USED AS CADET TRAINING SHIP.—The *Iris*, former mother-ship of the Pacific torpedo flotilla and for years a fixture in San Diego harbor, is to be used as a training ship for cadets in the American merchant marine, according to official announcement made yesterday by representatives of the United States Shipping Board.

The *Iris* is now at Hanlon's shipyard, Oakland, having been sent there for repairs a few days ago after the vessel had been badly battered during a voyage from Honolulu to San Francisco.

It is planned to place about 300 cadets on the vessel, where they will be instructed in navigation, sailmaking and the handling of cargo by competent teachers. On its training cruises with the cadets the *Iris* will ply between Seattle, San Francisco and San Diego.—*S. and W. Union*, 28/3.

DESTROYERS BUILDING.—Homer L. Ferguson, president and general manager of the Newport News Shipbuilding Company, announces that the company is building 30 destroyers for the government, and that more destroyer contracts will be taken by the yard, if such is the desire of the shipping board.—*Nautical Gazette*, 28/3.

CAPTAIN OF PORT FOR PHILADELPHIA.—A big boost to the business of the port of Philadelphia was given a few days ago when the government issued an order directing that all explosives for export from both Canadian and American factories must be loaded at Philadelphia, instead of New York and other Atlantic ports. The Treasury Department has decided to detail an officer from the navy to supervise the work who will be known as the captain of the port. He will have a steam vessel under his command manned by a naval crew. The port captain will not only designate anchorages for vessels loading ammunition, but will also superintend loading. The new order will be effective as soon as an officer can be detailed from the navy to act as the captain of the port.—*Shipping*, 13/4.

CUMBERLAND HOSPITAL TAKEN OVER FOR NAVY.—The Cumberland Street Hospital, in Brooklyn, which is within two blocks of the New York Navy Yard, will be taken over by the government to-day to be maintained as a naval hospital. This institution will be able to care for about 200 patients. For the time being the personnel of the hospital will remain unchanged. Patients now at the hospital will be transferred to three other institutions in Brooklyn—the Kings County, Coney Island and Greenpoint hospitals.—*N. Y. Herald*, 3/4.

SERIOUS IF TRUE.—During the comparatively short time since the navy took over several of the ocean-going tugs, which were formerly so frequently seen in this harbor, four of them have been lost at sea. When running here, these boats could and did stand any kind of weather at sea. After 50 years or more of building tugs for ocean work, the designers of all four of these tugs, with half a century of precedent to go by, built tugs which were staunch and seaworthy anywhere. Disasters to tugs were practically unknown in the merchant marine. When the navy took over the tugs, the captains and crews who had manned them were sent ashore. Naval reserves were put on board, with 40 men to a crew, where about 15 had been a full complement before. The deck houses, formerly low and small as possible, were enlarged and guns were mounted on the tops of the houses in some cases. The original designers of the tugs avoided every possible bit of top-heaviness.

Men of the merchant marine say that the changes which have been made in the tugs have rendered them top-heavy, and say further, that that is one of the reasons for the trouble which has followed. Four tugs whose names in their merchant marine days were the *Concord*, *Edgar F. Luckenbach*, *Fred E. Richards* and *Jack T. Scully*, have been lost recently, with heavy loss of life. A well-known Providence captain was at Norfolk, in his vessel, before the *Jack T. Scully* went to sea with her crew of naval reserves. This captain says it was common talk among the practical master mariners there that the *Scully* would be lost the first time she went out to sea. The prediction proved true.—From the *Providence Journal*.—*Marine Journal*, 23/3.

NAMES FOR NEW DESTROYERS.—Secretary Daniels announced on March 10 the names of five new destroyers named for distinguished officers of the U. S. Navy as follows:

1. The *Thatcher*, in honor of Rear Admiral Henry Knox Thatcher, a native of Maine, who in 1862-63 commanded the *Constellation* in the Mediterranean watching for Confederate cruisers, and in 1864-65 commanded the *Colorado* and a division of the North Atlantic blockading squadron in the attacks on Fort Fisher. His last duty was as port admiral at Portsmouth, N. H., 1869-70. He died at Boston, April 5, 1880.

2. The *Palmer*, in honor of Rear Admiral James Shedden Palmer, a native of New Jersey, who entered the navy in 1825 as a midshipman, and commanded the *Flirt* in the blockade of Mexican ports during the war with Mexico. During the Civil War among other duties he was Farragut's commander in the *Hartford* when he ran the batteries at Port Hudson in March, 1863.

3. The *Lamberton*, in honor of Rear Admiral Benjamin P. Lamberton, a native of Pennsylvania, who was Admiral Dewey's chief of staff at the battle of Manila Bay and on June 10, 1898, was advanced seven numbers for eminent and conspicuous conduct in battle. He was retired February 25, 1906, and died June 9, 1912.

4. The *Tattnall*, in honor of Captain Josiah Tattnall, a native of Georgia, who entered the U. S. Navy as a midshipman in 1812, served in the seaman's battery on Craney Island in the War of 1812, and with a force of navy yard workmen took part in the battle of Bladensburg. During the Algerine War he participated in the engagements of Decatur's squadron

and in 1823-24 served in the *Jackal* in the suppression of piracy in the West Indies. He commanded the Mosquito Division in the war with Mexico, where he was severely wounded. The state of Georgia gave him a vote of thanks and a sword. While flag officer of the Asiatic squadron in 1857, finding China at war with the English and French fleets, he joined them at Pei-ho. Shortly before an engagement his flagship grounded and was towed off by English boats. This service was taken as a justification for subsequent active participation in the attack on the Chinese. In explanation of his violation of neutrality Tattnell exclaimed, "Blood is thicker than water," a phrase that became historic.

5. The *Kennison*, in honor of Acting Volunteer Lieutenant William W. Kennison, who was commended and made an acting volunteer lieutenant in 1862, for gallant conduct in the action between the U. S. S. *Cumberland* and the Confederate ironclad *Merrimac*. He entered the navy as acting masters' mate August 28, 1861, from Massachusetts.—*Army and Navy Journal*, 16/3.

Secretary Daniels on March 31, announced the following names for new destroyers being built for the navy:

1. The *Belknap*, named in honor of Rear Admiral George Eugene Belknap, U. S. N., who was born in Newport, N. H., January 22, 1832; appointed midshipman October, 1847. He died at Key West, April 7, 1903. His earliest days at sea were with the East India Squadron. During the Civil War he took part in many engagements and in the reinforcement of Fort Pickens, Fla., in 1861, and later commanded a division of boats. He participated in the operations in Charlestown harbor and commanded the ironclad *Canonicus* in attacks on Fort Fisher, N. C., in 1864-1865. He returned to Charlestown, S. C., and fired the last gun against its defences. In 1867-1868 he commanded the *Hartford* and was in command of the expedition against Formosa.

2. The *Badger*, named in honor of Commodore Oscar C. Badger, U. S. N., a native of Connecticut, who was appointed midshipman September 9, 1841, becoming a commodore in 1881. He was retired in 1885 and died in 1899. In the Mexican War he was at the first attack on Alvarado. While attached to the *John Adams* in 1856, he commanded a party sent to attack the Fiji Islands and destroy the village of Vutia. At the opening of the Civil War, he commanded the *Anacostia* and other vessels of the Potomac flotilla in attacks off Cock-Pit Point, Aquia Creek batteries and other localities on the Potomac. He also took part in the siege of Yorktown and defences of Gloucester Point, Va. He commanded the ironclad *Montauk* in the night attack on Sumter in August, 1863, and was flag captain of the squadron. In the night attack on Sumter in September, 1863, while on the flagship *Weehawken* he was severely wounded.

3. The *Walker*, named in honor of Rear Admiral John Grimes Walker, U. S. N., who was born at Hillsborough, N. H., March 20, 1835; appointed acting midshipman in 1850. He died in 1907. During the Civil War he served with distinction on vessels engaged in operations on the Mississippi River and along the Atlantic coast. In 1862, he was at Forts Jackson and St. Philip; was at the capture of New Orleans and in the attack on Vicksburg made the passage between the batteries both ways. He also participated in the attack on Haines Bluff, took part in the Yazoo Pass expedition and capture of Yazoo City, and during the siege of Vicksburg was in command of a naval battery with the 15th Army Corps.

4. The *Crosby*, named in honor of Rear Admiral Pierce Crosby, U. S. N., who was born in Delaware County, Pa., was appointed a midshipman in 1838. In the Mexican War he took part in the attack and capture of Tuxpan and Tobasco. At the outbreak of the Civil War his first duty was to keep open the communication between Annapolis, Md., the Chesapeake Bay and Havre de Grace. Prior to the battle of Big Bethel he volunteered to take a converted canal boat, the *Fannie*, with her boilers held down to the decks by chains and proceeded with her to the attack on

Forts Hatteras and Clarke in order to have a light draft vessel for landing troops. When the sea had swamped the troop boats, Lieutenant Crosby took a ship's heavy launch and continued the landing of 300 men. The following day the squadron closed in from sea and captured a garrison of 700 men, which by Crosby's picket line had been prevented from making a reconnaissance and learning the exact strength of the Federal troops. In 1863, while in command of the *Florida*, he destroyed two blockade runners and in 1864 captured five more blockaders. Admiral Crosby planned and directed the construction of torpedo nets on the Blakely River and superintended the removal of 140 torpedoes, clearing the way so as to allow the squadron to pass safely to Mobile. He was retired in 1883.

5. The *Gamble* is named in honor of Brevet Lieutenant Colonel John M. Gamble, U. S. M. C.; appointed a second lieutenant in the Marine Corps, January 16, 1809. He served during the War of 1812, and while in command of the marine guard of the *Essex* was temporarily placed in charge of three prize vessels. His ship remaining absent, and despairing of her return, he rigged up the prize ship with the intention of quitting the Marquesas. During a fight with mutineers of his command who took one of the prize ships, Gamble was badly wounded in the foot and later in an engagement with the natives, one officer and three of his men were killed and one severely wounded. With but four men on board one of the ships fit for duty Gamble put to sea, and without a chart made his way to the Sandwich Islands in 17 days, only to fall into the hands of the enemy, being later released. Lieutenant Peter Gamble, U. S. N., who shares with Commodore Gamble the honor of having this new destroyer bear his name, was appointed a midshipman January 16, 1809, and lieutenant March 17, 1814. He was on duty at Providence, R. I., until October 9, 1813, when he was transferred to the U. S. S. *Enterprise*, ordered to Lake Champlain in May, 1814, and was killed in action September 11, 1814.

6. The *Twiggs*, named in honor of Major Levi Twiggs, U. S. M. C., who was appointed second lieutenant November 10, 1813. He was killed in battle September 13, 1847, at the storming of the castle of Chapultepec in the Mexican War. Major Twiggs served during the War of 1812, and commanded the marines on the U. S. S. *President* during the engagement between that vessel and the British ships *Majestic*, *Endymion*, *Pomona* and *Tenedos* in January, 1815. He served with the marines co-operating with the army in the campaigns against the Indians, in Georgia and Florida, in 1836 and 1837. Major Twiggs was in command of the volunteer division of General Scott's Army, which, with a pioneer party of 70, under command of Captain J. G. Reynolds, also of the marines, were placed at the head of the column which stormed the castle of Chapultepec, Major Twiggs being killed while leading the assault.—*Army and Navy Journal*, 4/6.

BATTLESHIPS AND BATTLE-CRUISERS BUILT, BUILDING OR AUTHORIZED.—American battleships are the largest which have yet been laid down by any nation. The largest British battleship of which we have knowledge displaces 27,500 tons; the largest German, 28,448 metric tons, or 28,000 of our tons. The largest Japanese displaces 30,600 tons. These may be compared with our *Arizona* and *Pennsylvania*, 31,400 tons; *Idaho*, *Mississippi*, and *New Mexico*, 32,000 tons; *California* and *Tennessee*, 32,300 tons; *Colorado*, *Maryland*, *Washington*, and *West Virginia*, 32,600 tons. The six new battleships which have been authorized are designed to be 41,500 tons.

Our new battle-cruisers of 35,000 tons and 35 knots will be the fastest in the world, having a speed equal to the latest and fastest destroyers. They will also be the largest in the world, with the sole exception of the four British battle-cruisers of the *Hood* class, which are 41,200 tons.—*Official Bulletin*, 3/4.

A NAVAL HERO OF 1917 HONORED.—In naming the new destroyers recently, the Navy Department very properly selected the name of Ingram for one of these vessels in honor of Osmund K. Ingram, gunner's mate, who gave his life to save the destroyer *Cassin*, which was attacked by a German submarine last winter. This destroyer sighted a submarine and started at full speed toward it. The latter submerged, firing a torpedo at the destroyer. When this missile was about 400 yards away Ingram, seeing that the torpedo would strike near the part of the ship where high explosives were placed, ran back to certain death to throw these charges into the sea, which he did an instant before the torpedo struck. He was killed, but his ship and comrades were saved, showing that our navy to-day has heroes worthy to be named with those of the Revolution, the War of 1812 and the Civil War.—*Marine Journal*, 13/4.

PERSONNEL

STRENGTH OF THE NAVY, MARCH 13, 1918

	Enlisted men	Officers	Total
Regular Navy	192,385	7,798	200,183
Naval Reserve Force	79,069	¹ 10,033	89,102
Marine Corps	38,629	1,389	40,018
National Naval Volunteers	15,000	805	15,805
Coast Guard	4,250	639	4,889
Total	329,333	20,664	349,997

¹ Includes some officers enrolled in various branches of reserve who have not yet been called into active service.—*Official Bulletin*, 9/4.

NAVAL RESERVE FORCE.—At the declaration of war some 10,000 officers and men had been enrolled in the Naval Reserve Force, a large percentage being on duty at the time under training. Enrollments have continued until at the present time there are about 80,000 men and over 10,000 officers.

Reservists are employed in nearly every activity in the navy. Many merchant officers were enrolled and assigned to duty on merchant ships taken over by the navy. Officers were assigned to duty on battleships and destroyers in both deck and engineering departments. On shore, reservists are assigned to patrol duties, and in every bureau, yard, and station under the Navy Department. A large naval reserve flying corps is being built up, its members being on duty abroad as well as in this country.

The naval reserves have been invaluable in assisting the navy to meet the large war-time expansion. There is now a bill before Congress transferring all national naval volunteers to the naval reserve. It is hoped to retain practically all reservists after the war and have a well-trained force available for instant mobilization in case their services are again needed.—*Official Bulletin*, 9/4.

COORDINATING NAVAL TRAINING.—Captain Orton P. Jackson, chief of staff of the Atlantic fleet; Captain Ridley McLean, chief of staff of battleship force No. 1 of the fleet; Captain Carlos B. Brittain, commanding the *Michigan*, and Commander Arthur B. Cook and Lieutenant Commander Edward J. Foy, of the staff of the commander-in-chief of the fleet, are temporarily ashore in connection with improvements in the system of training recruits for service in the fleet. It is desired so to coordinate the work at the training stations and in the fleet as to obtain the best possible results. In this connection the officers from the fleet are visiting the stations at Great Lakes, Ill., Newport, and Hampton Roads, in order that there may be opportunity to impart to the officers there the particular needs and to suggest such changes as may be found advisable. On the other hand, the fleet

officers will have opportunity to learn the problem encountered at the training stations and to adjust the subsequent training aboard ship in accordance therewith. It is intended that advantage shall be taken of the best features of instruction both ashore and afloat. Moreover, it is intended also to attain uniformity in the systems of instruction at the several stations, in order that, as far as possible, recruits sent aboard ships from different stations will represent on the average about the same knowledge and proficiency. For this purpose the commandants of the three stations have been directed to visit and consult with one another. The visits of these officers to the training stations are in accordance with the unceasing efforts of Rear Admiral Leigh C. Palmer, chief of the Bureau of Navigation, who has general charge of recruiting and training, to bring the system to and to maintain it at the highest possible state of efficiency. In January of last year there were about 56,000 men, including reserves, in the naval service. The numbers have been increased until to-day, at the end of the first year of the war, there are over 300,000 enlisted men, including regulars and reserves of all kinds. At the beginning of the war, the training stations could accommodate about 6000 apprentice, seamen, and to-day there are barracks at the regular training stations for 50,000 men, and in addition there are men in training in naval districts in barracks and schools provided by the Bureau of Navigation, and also at several schools and colleges that have been requested to assist in the training for special ratings. Since we entered the war, training also was started in the battle fleet, and every vessel, both at home and abroad, now is an active training unit for both officers and enlisted men, in addition to carrying out its main mission of immediate readiness for battle. Trained destroyer, submarine, and patrol-boat men are being brought back from time to time as nucleus crews to man many of the new vessels being put in commission, and the battleships are turning out specially trained crews for new battleships and for all other vessels in the fleet.—*Army and Navy Register*, 6/4.

WILL TRAIN ENGINEERS AT STEVEN'S INSTITUTE.—The Navy Department announced that it had designated the Steven's Institute of Technology, in Hoboken, as headquarters for the new United States steam engineering school for the training of engineer officers for the United States Naval Auxiliary Reserve. This school is the only one devoted to the training of engineer officers for steam engine service, and is a branch of the large training school at Pelham Bay Park. The education of the engineer officers is under the direction of Professor F. L. Pryor, of Steven's Institute, and Dr. Humphreys, the president, who has been designated civilian director.

A five months' course for the training of officers is contemplated, one month to be devoted to military and ship training at Pelham, one month for instruction at Steven's Institute, one month in inspection and repair work at local shipyards, machine shops and boiler shops, one month at sea and one month of subsequent training and examination at Steven's Institute.—*N. Y. Herald*, 3/25/18.

MORE NAVY OFFICERS NEEDED.—The recommendation in the Naval Appropriation Bill, for the fiscal year ending June 30, 1919, that the enlisted personnel of the navy be increased from its present strength of 150,000 to 228,000 "with a proportionate increase in the officers" calls attention once more to the critical need for navy officers, a need growing more imperative as time passes and the fleet and personnel grow beyond all past navy experiences so far as mere numbers are concerned. If Congress approves the increase in personnel recommended 78,000 enlisted men will be added to the navy. On the broad basis of the proportion established by the act of August 29, 1916, this would mean that 3120 commissioned line officers for active duty would have to be added to the officer personnel of the navy. The bill as it stood when reported to the House by Mr. Padgett, chairman



WAR COUNCIL OF THE NAVY DEPARTMENT.
Committee of Public Information

of the Naval Committee, proposes to make a temporary increase of four captains and seven commanders in the navy and to include the rank of lieutenant commander in the grades for temporary commissions for the period of the emergency. The act of May 22, 1917, "for the temporary increase of the navy," it will be remembered, limits temporary appointments to those not above the rank of lieutenant.

These two provisions will not affect in a general way the following unofficial estimates of the distribution of 3120 new officers if assigned to grades in accordance with the present law. It must be remembered, however, that there are refinements in personnel statistics as worked out in the Navy Department that are not used here. For example, these estimates are figured on a 4 per cent basis, whereas in the last officer personnel estimates issued by the Bureau of Navigation the figure used in working out the proportion of officers to men was ".4077+." In our estimates we use the paragraph in the act of August 29, 1916, which reads: "Whenever a final fraction occurs in computing the authorized number of army corps, grade or rank in the naval service, the nearest whole number shall be regarded as the authorized number." On this basis the figures that follow are compiled.

The result of the increase in the enlisted personnel of 78,000 men and the consequent increase of 3120 commissioned line officers for active duty would be the following distribution in the various commissioned grades:

Flag officers, 31; captains, 125; commanders, 218; lieutenant commanders, 437; lieutenants, 1014; lieutenants (J. G.) and ensigns, 1295.

These estimates are arrived at, of course, through the proportions of one, four, seven, fourteen, thirty-two and a half, and forty-one and a half, established by the personnel section, act of August 29, 1916. Even in war this may seem like an enormous increase in the officer personnel of the navy, particularly to the older officers who have grown hardened to the idea of long service in grade before promotion. But that the estimates are not exaggerated may be demonstrated by a comparison with the last official estimate of the officer personnel of the navy, made by Rear Admiral Leigh C. Palmer, U. S. N., in his annual report as chief of the Bureau of Navigation for the fiscal year 1916. In that report Admiral Palmer urged an increase in the officer personnel of the navy to meet "the large program provided in the recent bill." In order to fix a reference date, the Bureau of Navigation made its computations as of July 1, 1921, "and to carry out the program of 1921," Admiral Palmer stated, "will require 4487 commissioned line officers on the active list." According to Admiral Palmer's table the distribution of estimated total number of line officers, "if assigned to grades in accordance with the present law," would be as follows:

Flag officers, 45; captains, 179; commanders, 314; lieutenant commanders, 628; lieutenants, 1458; lieutenants (J. G.) and ensigns, 1863.

If this total increase of 4487 is compared with our predicted increase of 3120 it will be seen that our figures for the forthcoming increase and distribution of grades (given that Congress grants the increase) are approximately correct. The growing flotilla of destroyers and the new *Eagle* class of boats, to say nothing of the increase in the number of transports that must be officered by the navy, shows that the above estimate is a theory that is rapidly growing into a condition which must be provided for.—*Army and Navy Journal*, 30/3.

NAVAL APPROPRIATION BILL.—Carrying appropriations amounting to about \$1,325,000,000, the Naval Appropriation Bill for the fiscal year ending June 30, 1919, is ready for report by the House Military Committee. Last year's bill, the largest Naval Appropriation Bill in our history, carried \$1,625,000,000. The committee in arriving at the total for the coming year made reductions of about \$135,000,000 from the estimates. An outstanding and most commendable feature of the bill is the authorization of a resumption

of the building of naval vessels under the three-year building program. This program has not been carried out in the last year owing to a sudden decision of naval experts to abandon the building of some of the larger vessels for that of destroyers needed for attacking submarines, as destroyers are more effective in the submarine zones. It is now reported that enough such vessels have been contracted for or built, therefore the committee recommends that the building program this year shall provide for the following: One battleship; three battle-cruisers; three scout cruisers; one fleet submarine; one ammunition ship; one transport; one destroyer tender; and one hospital ship.

For extension of the navy program, the bill recommends that a blanket appropriation of \$100,000,000 be made to the President of the United States to be used for the expeditious building of destroyers and craft deemed necessary in submarine work. It is the idea of the committee to place this money in the hands of the President to be used as a fund which need not be accounted for at present, and under this system it is believed that this country will keep some of the secrets of the navy's building activities from the enemy.

One distinctly new recommendation in the bill is for the construction of a dry dock at Charleston, S. C., to cost \$4,000,000. It is also provided that \$5,000,000 shall be authorized for the dredging of the channel at Charleston to a depth of 40 feet. The present channel has a depth of 30 feet. Representative Padgett said that the committee in deciding upon this new dry dock wanted to provide adequate facilities for the navy on the Atlantic coast.

Some of the larger items carried in the bill are: Aircraft, \$188,000,000; ordnance stores, \$24,194,045; manufacture smokeless powder, \$2,400,000; increasing facilities to test guns, \$1,000,000; new batteries for battleships, \$48,309,523; torpedoes, \$1,000,000; powder ordnance supplies, \$50,000,000; preserving ammunition for vessels, \$39,000,000; emergency expenses in navy yards, \$4,750,000; outfits for enlisted men, \$9,975,000; instruments and supplies, \$3,469,000; schools of instruction, \$2,655,360; reserve ordnance and supplies, \$33,000,000; Bureau of Yards and Docks, \$12,000,000; Bureau of Medicine and Surgery, \$10,850,000; Bureau of Supplies and Accounts, \$213,229,557; provisions, \$64,485,300; maintainance, \$12,000,000; Bureau of Steam Engineering, \$50,000,000.

For public works at the different navy yards and stations, these items are recommended: Brooklyn, \$850,000; Philadelphia, \$2,400,000; Norfolk, \$3,900,000; Mare Island, \$1,200,000; Hampton Roads Naval Base, \$2,500,000; San Diego Marine Corps Base, \$1,500,000.

Personnel.—The bill recommends the increase of the personnel of the navy from 150,000 to 228,000 men and the increase of the marines from 30,000 to 50,000 men with a proportionate increase in the officers in each branch of the service.

It also recommends the creation of the rank of major general in the marine corps and the appointment of three temporary brigadier generals; 12 temporary colonels, and 12 temporary lieutenant colonels in the marine corps. By increasing the personnel in the marine corps there will be a large increase in majors and officers below that rank, based upon the percentage under the existing law.

It is further recommended that the limit of rank for temporary officers appointed in the navy shall be raised so as to include the rank of lieutenant commander. This is necessary, the committee points out, because of the increase in the number of small craft, such as torpedo-boat destroyers, submarine chasers, and destroyers. It is estimated by Representative Padgett that at least 275 new lieutenant commanders will be created by the proposed change in the law. It is further proposed in the bill to make a temporary increase of four captains and seven commanders in the navy.—*Army and Navy Journal*, 16/3.

SECRETARY DANIELS OR ROOSEVELT MAY GO ABROAD.—Either Secretary of the Navy Daniels, or Franklin D. Roosevelt, Assistant Secretary of the Navy, will go to France soon after the return to America of Secretary Baker, according to unofficial report this week. The proposed visit is mainly for consultation with American Navy officers and probably with the naval members of the Supreme War Council at Versailles. The object is to obtain a first-hand view of what is being done by the allied naval forces in order to put Mr. Daniels or Mr. Roosevelt in better position to understand just what has been done, what is being done, and what it is intended to do in the way of naval operations. The responsible officials of the Navy Department have a clear idea of the plan under which the allied naval forces are working, but the opinion prevails that it will be of benefit to obtain the first-hand view.—*Army and Navy Journal*, 23/3.

POLICY

NAVAL COMMANDS ABROAD.—The criticisms recently made of the fact that our destroyers serving in British waters are under the immediate command of an officer of the British Navy, Admiral Sir Lewis Bayly, and not under an American flag officer, have come to the attention of the naval authorities. It is pointed out that the present circumstances surrounding the anti-submarine work of the destroyers are such that it is not practicable to segregate them into a single command. They are a part of a large force under command of Admiral Bayly, and they are outnumbered many times by the British vessels, of various classes, belonging to the force. As it is not practicable to operate them separately as a single command, necessarily they come under the commander of the entire force. Moreover, as there is a large preponderance of British vessels in the force, it would not be logical to place an American naval officer in command of it. Vice Admiral Sims is the commander of all the American naval forces operating in European waters. The vessels of his command are operating in widely separated zones, some directly under American flag officers and some under officers of other navies of the Allies, dependent upon the character of service and the location of the areas in which they are serving. No question has been raised in Admiral Sims' forces as to such details as under whom the vessels may be serving. The one aim of the personnel of the vessels of the various classes has been to render the most efficient service to the allied cause afloat, no matter under whose immediate command the work may be going on.—*Army and Navy Register*, 13/4.

SECRETARY DANIELS PROTESTS AGAINST BILL TRANSFERRING CONTROL OF NAVAL OBSERVATORY.—Secretary Daniels has sent the following letter to Chairman Padgett, of the House Committee on Naval Affairs:

My Dear Mr. Padgett: The Navy Department wishes to express most emphatically its disapproval of H. R. 10954 to change the name of the United States Naval Observatory and to transfer the same to the Smithsonian Institution.

The United States Naval Observatory has grown to its present proportions and position in the astronomical world through the efforts and under the control of the navy and this department believes that its continued efficiency can best be maintained by retaining the present organization.

Any interference in the work of the observatory at this time when all are engaged in war work in addition to regular routine duties interrupts the supply of nautical instruments to the active fleet which may cause disaster.

The work done to keep up the supply of chronometers, sextants, compasses, and other necessary instruments is more or less confidential and it is advisable not to put it in this communication, but it will be furnished in a verbal report if desired.

In addition to its work for the navy, the observatory has the custody of sextants and chronometers purchased by the shipping board.

In March, 1909, the Secretary of the Navy issued an order establishing an astronomical council and stated, "The astronomical work of the Naval Observatory shall be so planned and executed as best to subserve the following purposes and no others, to wit:

"To furnish to the Nautical Almanac Office, as far as may be possible, such observations and such data as may be needed for carrying out the purpose of the law under which the appropriations for that office are made from year to year, which is as follows:

"For preparing for publication the American Ephemeris and Nautical Almanac and improving the tables of the planets, moon, and stars"

"The principal work of the observatory shall be in the field of the astronomy of position as distinguished from astrophysical work, and shall be the continued maintenance of observations for absolute positions of the fundamental stars and of stars which are to be made fundamental, and in addition, the independent determination by observations of the sun, of the positions of the stars, moon, and planets with reference to the equator and equinoxes."

The duties of the institution have been so arranged that it is believed entirely satisfactory results have been attained, while the operations move with a common purpose known to the entire staff. The council has held its regular meetings and special meetings for the consideration of matters requiring prompt action.

The Naval Observatory consists of an astronomical department for securing the most accurate positions of the heavenly bodies possible; a nautical department in which are tested and repaired navigational instruments for the navy; an office for the preparation of a nautical almanac by which the ships ascertain their positions at sea; a time service by which the operation of all railroads, ships, and commercial bodies are furnished accurate time daily; a compass office in which the latest form of compasses are examined, as well as a means to show the younger naval officers the latest improvements in them; an inspection department, with inspectors at New York, Boston, and San Francisco, under direct supervision of the observatory. These inspectors are on duty at the factories of manufacturers engaged in the production of navigational material for the navy and United States Shipping Board. There is not another national observatory in any country that has all these departments combined under one head and carried on in one plant. Therefore, when this question of expense arises and comparisons are made, those separate departments should be combined to get the true cost.

A few of the complimentary notices from competent authorities are appended.

Faithfully yours,

JOSEPHUS DANIELS.

HON. L. P. PADGETT,

*Chairman Committee on Naval Affairs, House of Representatives,
Washington, D. C.*

DANIELS GIVES SHIP FIGURES.—Chicago, April 10.—Since April 6, 1917, the day on which war was declared against Germany, there have been added to the United States Navy 1275 vessels aggregating 1,055,116 tons, Secretary of the Navy Daniels declared tonight in an address before the Chamber of Commerce of the United States.

"In addition to the battle-cruisers, dreadnoughts and scout cruisers authorized, some building and others deferred temporarily for the more pressing construction of ships to transport soldiers and munitions and supplies," he said, "we are now building what is technically known as smaller craft from 65 to 1215 tons each, 794 vessels with an aggregate tonnage of 420,217 tons.

"America now has 36,000 men of the navy in European waters on active duty. On May 4, an American destroyer flotilla reached European waters,

followed by navy detachments on May 15 and 24. On June 6, naval aviators were landed in France.

"When the time comes for the discussion of peace terms two things will be demanded: First, that any country that shall employ submarines shall be classed as a pariah among nations; second, that a high tribunal shall be established to which all disputes must be referred, and from which there shall be no appeal. To see that there shall be no appeal from the decision of this international body, America will have a navy large enough to enforce every decision, if necessary.

"Whatever else others may say, that country with the most powerful navy is going to win this war."—*Baltimore Sun*, 11/4.

MERCANTILE MARINE AND SHIP BUILDING.—*To Try Concrete Ships*.—President Wilson has approved the shipping board's suggestion for an appropriation of \$50,000,000 to experiment with concrete ships. Chairman Hurley conferred with Chairman Sherley, of the House Appropriation Committee, who has promised to introduce the appropriation bill immediately and press its passage. No opposition to the measure is expected in either House. It is planned to make \$15,000,000 available at once.

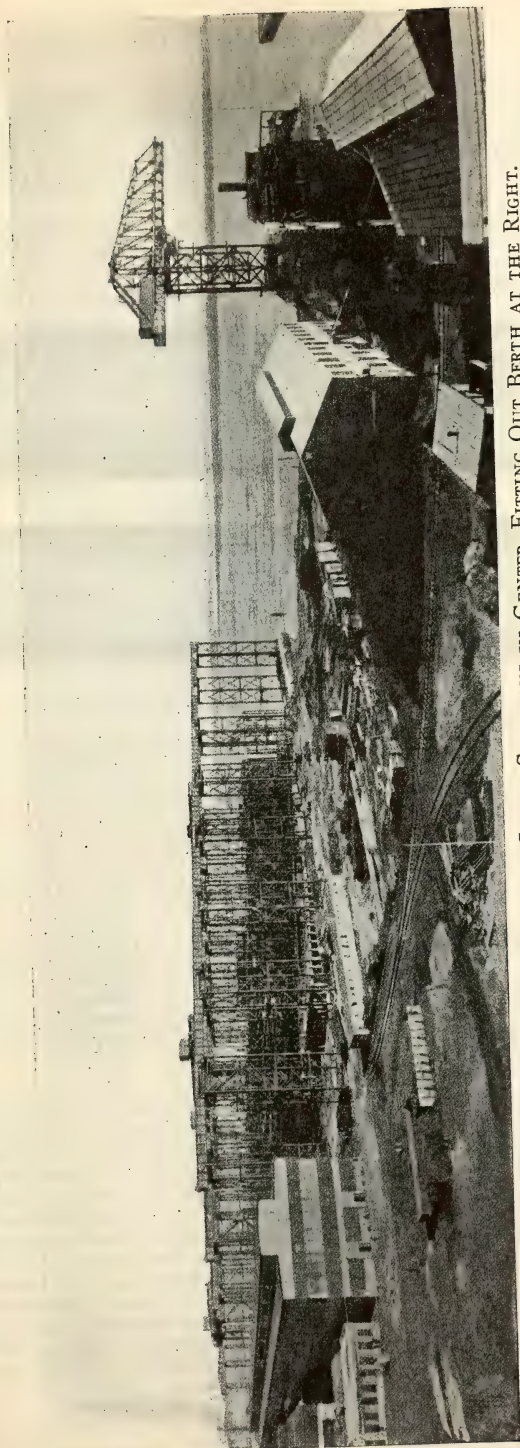
The President is said to be keenly interested in the new type of construction. He has talked several times with Mr. Hurley, Senator McCumber, who is urging the appropriation in the Senate, and other officials who believe concrete ships will prove an important link in the "bridge across the Atlantic." Chairman Hurley frankly has said concrete construction is an experiment, but that the shipping board does not feel warranted to pass over any possibility of turning out ships quickly because the experiment may not prove a success.

Everything that can be done to ascertain the possibility of using concrete ships commercially has been done by the shipping board. R. J. Wig, an expert in concrete construction, recently completed an examination of piers, bridges, etc., to determine the effect of sea water on concrete. Mr. Wig also observed the launching of the concrete ship *Faith* in California, and made a report officially described as "very enthusiastic" of the behavior of the vessel. Tests of concrete construction have been made at the Bureau of Standards under the personal direction of Secretary Redfield.

Conclusions from all these experiments have convinced many experts that concrete ships will be a success. They regard such ships as essentially "covered bridges" capable of standing all the strain and the stress which concrete bridges have undergone without damage. Shock is the one big undetermined factor and they believe that the resistance of concrete ships to shock can be determined only by actual experiment with the vessels themselves. The chemical action of sea water on concrete also has not fully been determined yet, but from observations already made experts do not believe it will cause speedy disintegration.—*Baltimore Sun*, 14/4.

CAMOUFLAGE OF AMERICAN MERCHANT VESSELS.—Camouflage of all American merchant vessels of the shipping board is announced in a statement that a special department has been organized. The work will be under direction of a district camoufleur in every construction district.—*Baltimore Sun*, 11/4.

DEVICE FOR PROTECTION AGAINST SUBMARINES FOR MERCHANT SHIPS PERFECTED.—The United States Shipping Board has perfected a new device for the protection of merchant shipping against torpedo attack, which is to be applied at once to every American ship, plying in the submarine area. The device consists of the installation of additional temporary bulkheads so the number of water-tight compartments in each ship will be doubled.—*N. Y. Herald*, 13/4.



VIEW OF SHIPYARD SHOWING FABRICATING SHOPS, SHIPWAYS IN CENTER, FITTING OUT BERTH AT THE RIGHT.

CAMOUFLAGE OF SHIPS USELESS.—At a meeting of the Brooklyn Chamber of Commerce, Mr. Lewis Nixon, the shipbuilder, declared that the camouflage of ships was a useless art. The peculiar coloring of our ships is of no avail, he declared, because the Germans have invented a periscope that reveals the ship in outline regardless of the coloring.—*Nautical Gazette*, 11/4.

COASTWISE SHIPPING TAKEN OVER.—President Wilson, by proclamation, directed the taking over of all coastwise shipping lines of the country at noon next Saturday and empowered the Director General of Railroads to control and operate them for the period of the war.—*N. Y. Herald*, 12/4.

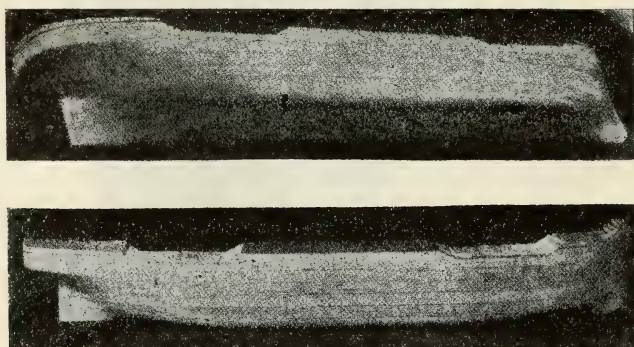


FIG. 6.—MODEL OF THE STRAIGHT-LINED HULL.

TRANSFER OF JAPANESE TONNAGE TO U. S.—Negotiations for the transfer of 150,000 tons of Japanese shipping to the United States have been completed on the basis of two tons of steel plates for one ton of dead-weight ship capacity. This agreement is understood to be a preliminary one, to bridge over the period of negotiations now being conducted by American Ambassador Morris, at Tokio, for a wider and more permanent understanding. Both nations will sign the agreement shortly.—*Army and Navy Journal*, 30/3.

DENIAL OF PURCHASE OF RUSSIAN SHIPPING.—It has been authoritatively denied at the Navy Department that Admiral Knight, commander of the Asiatic fleet, had purchased any shipping on the Russian coast. He could not have acted without instructions, it was asserted; and not only have no instructions on such a subject been issued to him, but there has been no communication upon it.—*Nautical Gazette*, 23/3.

PACIFIC MOTOR SHIPS UNSATISFACTORY.—Builders of auxiliary powered schooners are not finding as ready a sale for vessels of that class as they did several months ago, according to a statement in the Tacoma, Wash., *Ledger*. Some thirty-odd of this type of cargo carriers have been turned out by North Pacific shipyards during the past 18 months. One explanation is the poor showing made by so many of these vessels of the auxiliary type on their maiden voyage. Not a few of them departing overseas have had to tow or limp into some port not their destination. Two of them are lying crippled at Panama, another had to be towed into Honolulu, and mishaps of one kind or another overtook still others. All of which has forced marine men to the conclusion that the auxiliary motor schooner with her semi-Diesel engines is not yet a "howling" success, neither has it proved a failure.

The comment of the British statesman some days ago to the effect that American institutions were still on trial, it is contended, applies aptly enough to the semi-Diesel engine. The criticisms of the auxiliary powered vessels is that with her power failing in so many instances to come up to expectations that the vessel in such cases almost invariably fails to measure up to requirements under her canvas.

However, impartial marine men of judgment believe the auxiliary powered vessel will yet demonstrate her worth. But they assert that she will do so only after some improvement of the present type of semi-Diesel engine manned or operated by an engineer apprenticed and specialized in the handling of semi-Diesel engines. This the engineers resent, claiming it to be the fault of the engine, not their own.

Local shipping men are inclined to believe it is the old story of the engine room men depending on the sails to move the ships while the sailors believe the engines ought to carry the burden. And because there are few men who are experts with sailing ships that are available for power schooners now, while Diesel engineers are almost a minus quantity, the result is that inferior men are operating the schooners, and their best results cannot be gotten out of them.—*Nautical Gazette*, 28/3.

SHIP DELIVERIES AND LAUNCHINGS IN MARCH.—The United States Shipping Board has issued the following summary of deliveries and launchings for the month of March, 1918:

Deliveries:	Dead weight tonnage
21 vessels	166,700
Launchings:	
6 contract steel vessels	51,650
21 requisitioned vessels	149,636
—	
27 vessels	201,286
9 others (wood and composite)	31,500
Grand total	232,786
	<i>Official Bulletin</i> , 2/4.

OFFICERS FOR DUTCH SHIPS.—American officers for five of the Dutch ships recently taken over by the government, who were "signed on" from among New England merchant marine sailormen by the recruiting service of the United States Shipping Board, left to-day for New York to join the vessels. There were 36 in the party. They are to be joined at New York by four others appointed from Baltimore.

This provides each of the five ships with a full complement of officers, consisting of captain, chief engineer, three mates, and three assistant engineers.

A considerable number of the Americans thus chosen to replace the Dutch officers who were on those ships, with 73 others by the government, are graduates of the free navigation and engineering schools maintained by the shipping board at Rockland, Portland, Gloucester, and Boston, to assist experienced men in getting their first licenses. The others chosen, including the captains, chief engineers, and first mates, have held licenses for some years, and were selected from lists recently compiled by the shipping board recruiting service after a census of the country's licensed deck and engineer officers available for immediate service in the new merchant marine.

Henry Howard, director for the shipping board, announced to-day that his department was at work assembling officers for several other Dutch ships and that he wished to hear from all sailors and engineers in all parts of the country who are licensed as officers, or who are qualified to enter one of the shipping board navigation or engineering schools to study for a license.

"The demand for American merchant marine officers is now brisk," he said, "and the man qualified to hold a license as deck officer or engineer who does not come forward is not doing his duty by his country."—*N. Y. Times*, 3/31/18.

PERSONNEL

It is figured that there will be launched this year in the United States an aggregate of 3,200,000 gross tons, or 5,000,000 tons dead-weight capacity of shipping and that the first thousand ships will call for 8000 officers—a captain and three mates, an engineer and three assistant engineers, or eight officers to a ship. The Navy Department can be relied upon to supply one-half of these officers, but to get the balance the Atlantic and the Pacific coast and the Gulf and the Great Lakes have been districted to gather in engineers and seafaring men to take short courses at technical schools that they may be able to officer these ships. Six hundred men are now in training and two training ships, the *Governor Dingley* and the *Calvin Austin*, are to be used for the practical training of those whose education does not fit them for officers of high rating. One of the difficulties met with is that the Navy Department has been enlisting as ensigns many of the men graduated for this service.—*Shipping*, 23/3.

THREE HUNDRED AND NINETY SHIPS CARRY MEN AND SUPPLIES.—By restricting imports, withdrawing ships from the less necessary trade channels, and obtaining neutral tonnage by agreement, the United States has been able to put 2,762,605 tons of shipping into the trans-atlantic service to carry men and munitions to France. Of this 2,365,344 tons are under American registry, the remainder being ships operated by private interests and neutral tonnage. There are in all 390 ships, of which 322 are of American registry.

It was said that the shipping situation, from the view-point of the United States, was more favorable than at any time since the nation entered the war. The tonnage now in service includes only a small part of the 500,000 or more tons of Dutch ships which were requisitioned. It is believed that the 3,000,000-ton mark will be reached when all of the Dutch shipping available for oversea service is in use.

To this tonnage will be added gradually the 250,000 tons which Japan has promised during the summer months, and the ships now under construction in this country which are nearing completion. Later, Japan will add another 200,000 tons or more which is to be built.

All of the shipping now available to the United States is being routed and loaded by the Interallied Ship Control Committee, of which P. A. S. Franklin is chairman. The increased efficiency which has been obtained by this committee during the last 30 days, it is said, has added 20 per cent to the service given by the fleet or the equivalent of 400,000 in figures of tonnage, over the February service.

Reports received from the shipyards lately have not been unfavorable, and it is believed that the April deliveries will set a new record, despite the delays in supplies and transportation troubles.

Apparently there is a general feeling of optimism over the situation and a conviction that the fleet available for trans-atlantic service will be gradually increased despite the best efforts of the German submarines. Barring some disaster in the shipyards it seems positive that the point has been reached where Germany cannot hope to cut down the total amount of tonnage, which the United States is now able to use in transit to Europe and must instead accept the verdict that the fleet will steadily grow in proportions.

The Ship Control Committee also has the power to route tonnage under the control of Great Britain and the other allied nations the tonnage of which is not given in the figures quoted above. Every energy is being put forward to add to the efficiency of this tonnage as well as by providing

better facilities for loading and unloading and a system of routing which will put an end to delays which have proved serious in the past.—*N. Y. Times*, 10/4.

MANNING THE AUXILIARY MERCHANT FLEET.—In that classic hearing—for it has become a classic—before a subcommittee of the House Naval Committee, certain representatives of the International Seamen's Union of America aired various theories on manning with naval crews the vessels transporting troops and carrying supplies to our Allies and our forces in Europe. These views would be diverting if, at the present crisis, they were not pathetic. Various imperfectly informed associates of the United States Shipping Board also recited their lessons, but as these are concerned mainly with other maritime interests they must, for the moment be passed over. Unfortunately the subcommittee's report is too long for press reproduction, but it may be commended *in extenso* to the intelligent study of those interested in discovering the methods by which the misguided International Seamen's Union of America is ruled.

In many instances flat charges were laid against the excessive manning by naval crews, as compared with what the simpler practice of the commercial marine needed. Good care was taken in this fearsome indictment to put aside all consideration of the insistencies of war and the perils of the danger zone. The subcommittee was, however, happy in its first-hand knowledge, in its acquaintance with the game and in its recognition of the subtleties of the protagonists.

The positive assertions of the labor leaders were therefore opposed by the equally positive and informed contradiction of the inquirers, and the nimble pea under the selected thimble was over and over called right at the first throw.

Taken by and large, it all ends in this, everything governmental afloat must be under naval control for the period of the war. Whenever and wherever a special effort must be exerted to train men for a commercial marine that is to be continuous, this always under naval administration, may be directed by deep water merchant masters and not by amateur yachtsmen, let us say, of the 30-foot class. The shipping board has its own fine work to do and to this it must devote all its possibilities, giving up the manning of its ships, of which it knows nothing, to a navy that so far seems to have proven its efficiency.—*N. Y. Herald*, 4/2.

SHIPPING BOARD SQUADRON TO TRAIN BOYS FOR SEAMEN.—The United States Shipping Board recruiting service at Boston, issues the following:

Unique in war equipment is a national squadron of training ships now being formed by the United States Shipping Board, on which young Americans between the ages of 17 and 27, may learn the trade of seagoing preparatory to service in the new merchant marine.

Famous Old Liner at Head.—Heading the squadron is the extrantransport *Meade*, well known to American sailors as the former Atlantic liner *City of Berlin*. Built in Scotland in 1874 for the avowed purpose of lowering the trans-atlantic speed record, the *City of Berlin* was not only the finest but the fastest ocean greyhound of her day. She captured the record both east and west between New York and Queenstown in 1875, her eastbound time being 7 days, 15 hours, and 48 minutes.

Served in Spanish War.—Taken by the United States Government in 1898 and renamed the *Meade*, the former record holder served as a transport in the Spanish War and for a dozen years thereafter.

In spite of her 44 years, the *Meade* is still a sound and handsome vessel. Her model is finely proportioned. Her bow, long and sharp, and adorned with an old-style figurehead in the form of a woman, is of a sort to delight the eye of a sailor.

The *Meade* is 523 feet long and 44 feet wide, and registers 5641 tons gross. She has a capacity for 1000 apprentices. The ship is now being over-

hauled at Newport News, Va., where she has been laid up for several years.

Boston Home Port.—She will be taken in the early spring to Boston, the home port of the shipping board's training squadron. Here are stationed two other vessels of the squadron, the *Calvin Austin* and *Governor Dingley*, sister ships, 300 feet long and 60 feet wide, formerly in passenger service on the New England coast. Each of these vessels already has on board a large complement of apprentices.

A fourth ship for the squadron is now being fitted out at New York, and will join the others in the early spring.

Training For 2700.—When all four ships are in commission, the training squadron will have capacity for more than 2700 apprentices, who will be drilled as seamen, firemen, oilers, water tenders, coal passers, cooks, and stewards.

Intensive training, including life-boat and fire drill, from a month to two months on the training ship, is to be followed by actual service at sea on board new cargo vessels of the merchant marine.

The training squadron is under the direction of the shipping board's recruiting service, Henry Howard director, national headquarters of which are in the Boston custom-house.—*Official Bulletin*, 4/4.

MARINES WITH DOMINICAN GUARD.—Marines on duty with the guardia nacional of the Dominican Republic probably will serve some time with that organization before they receive additional pay from the Dominican Government for the service. Although a law has been enacted empowering officers and enlisted men of the navy and marine corps to serve under the government of the Dominican Republic, the members of the navy and marine corps serving with the guard, which already is being organized by the marines, will not receive other than their service compensation until after the consummation of a treaty between this country and Dominica in which provision is made therefor. Thus the pay status is dependent not only on this condition but also on the policy that may be pursued by the Navy Department. The commandant of the marine corps believes that the compensation from the Dominican Government should be on the same basis as that pertaining to those serving with the Haitian Gendarmerie. Rear Admiral Harry S. Knapp, the naval commander at Santo Domingo City, has recommended a smaller scale, and it is understood that Secretary Daniels is disinclined to allow any additional pay at all. It may be stated in this connection that it was about a year after the passage of the act of Congress relating to organization of the Haitian Gendarmerie before the marines serving with that force were allowed additional pay from the Haitian Government.—*A. and N. Register*, 13/4.

DEVIL DOGS, NEW HUN NAME FOR AMERICAN MARINES.—That time honored nickname borne by the United States marines for generations, "leather necks," is no more!

At least the Germans have abandoned it, according to reports from France.

In its place the Teutons have handed the sea sailors one with far more meaning. They call the American scrappers "teufel hunden," which, in English, means "devil dogs."

"Gee, those guys rank us with the 'Ladies from Hell,'" declared a grizzled old marine sergeant, swelling with pride when he heard the new title.—*N. Y. Herald*, 15/4.

MARINE CORPS.—Since the opening of the present war the marine corps has grown from a total of 13,266 enlisted men and 426 officers to a present strength of 1389 officers and 38,629 enlisted men.

The increase in enlisted men has been by voluntary enlistments, in one instance a college battalion enlisting as a whole. The enlisted personnel rep-

resents all classes of the community, college and business men, professional men, athletes, mechanics, laborers, and in one instance an ex-congressman, who, though slightly over the usual age, has attained the rank of second lieutenant through his devotion to duty and application.

The recruit depots at Port Royal, S. C., and Mare Island, Cal., have proven equal to the demands made upon them and the preliminary training of this mass of recruits has been accomplished. No detail of the preliminary training of a soldier has been neglected, and on the transfer of these new men to the concentration camp at Quantico, Va., the majority have worn the insignia of expert rifleman, sharpshooter, or marksman.

Upon the completion of the recruit training the majority of the men have been transferred to the camp at Quantico to complete their course of intensive training in the new organizations formed at that post for service overseas. Five regiments of infantry, with their attendant replacement units, have been organized in addition to a brigade of artillery with attendant technical units, since the creation of this new post in June, 1917.

In addition to the brigade of marines in France, it is necessary to maintain forces of marines in Santo Domingo, Haiti, the Virgin Islands, Cuba, China, the Philippines, Guam, Porto Rico, Honolulu, and, to further illustrate the broad character of the foreign service of the marines, a small detachment in London. The fleet absorbs a considerable percentage of the present force, and it has been found necessary to augment the garrisons of the navy yards, naval ammunition depots, radio stations, and other posts in this country.—*Official Bulletin*, 9/4.

U. S. ARMY IN FRANCE.—The present location of U. S. A. forces in France which may have been moved since the commencement of the present offensive, has not been disclosed. It is reported that General Foch will not sacrifice inexperienced troops.

The American forces in the Toul sector have held their ground against frequent attacks, small detachments in the Cambrai sector participated with the British forces in their retirement.

Map I shows the position of the lines after the German thrust toward Amiens. Map II, the lines in Flanders up to March 18. (See pp. 1096 and 1097.)

FIELD CO-OPERATION WITH OUR ALLIES.—That General Foch, chief of the French General Staff and the French Military member of the Inter-Ally Supreme War Council at Versailles, has been made generalissimo of all the allied forces in the western theater of war was made known on March 29, the first positive intimation in the matter appearing in a message of congratulation from President Wilson to General Foch. The President cabled on March 29: "May I not convey to you my sincere congratulations on your new authority? Such unity of command is a most hopeful augury of ultimate success. We are following with profound interest the bold and brilliant action of your forces."

Lloyd George, the British Premier, announced General Foch's appointment on the following day in these words: "With the cordial co-operation of the British and French commanders-in-chief General Foch has been charged by the British, French and American governments to co-ordinate the action of the allied armies on the western front."

The first official announcement by the French Government of General Foch's appointment came in a communiqué of April 2, which read: "The British press announces that Foch has been appointed chief of the western front. The fact is that with a view to meeting the present situation the French and British governments, in agreement with the higher command, have entrusted Foch with the task of co-ordinating action of the allied troops on the western front."

Whether General Foch's authority extends over the Italian armies was not made known, but he will be in supreme command of the French, British,



MAP I.

American, Belgian and Portuguese armed forces on the western front. It is assumed that Italy's forces also will be subject to his orders.

Our Forces Offered by General Pershing.—A message from Gen. John J. Pershing, commanding the American Expeditionary Forces, received on March 29 by Major Gen. Peyton C. March, acting chief of staff, announced that our force in France has been placed in its entirety at the disposal of the supreme commander-in-chief. It read: "Have made all our resources available, and our divisions will be used if and when needed. French are in fine spirits, and both armies seem confident. (Signed) Pershing."

Two days later the French Government issued an official note accepting the offer which read: "The French Government has decided to accede to the desire expressed by General Pershing in the name of the United States Government. The American troops will fight side by side with the British and French troops, and the Star-Spangled Banner will float beside the French and English flags in the Plains of Picardy."

Beginning with March 30 the orders issued to the American troops were of French origin. The French papers were unanimous in their praise of General Pershing's action.

Secretary Baker's Comment.—Secretary of War Baker, who arrived in Paris from London on March 28, gave out a statement on March 30 saying: "I am delighted at General Pershing's prompt and effective action in placing all the American troops and facilities at the disposal of the Allies in the present situation. It will meet with hearty approval in the United States, where the people desire their Expeditionary Forces to be of the utmost service in the common cause.

"I have visited all the American troops in France, some of them recently, and had an opportunity to observe the enthusiasm with which officers and men received the announcement that they would be used in the present conflict. One regiment to which the announcement was made spontaneously broke into cheers."

Our Troops to be Brigaded with French and British.—An official British Government statement was issued on April 1 devoted to this matter of the co-operation of our troops in the field which reads:

"As a result of communications which have passed between the Prime Minister and President Wilson, of deliberations between Secretary Baker, who visited London a few days ago, and the Prime Minister, Mr. Balfour and Lord Derby, and consultations in France, in which General Pershing and General Bliss participated, important decisions have been come to by which large forces of trained men in the American Army can be brought to the assistance of the Allies in the present struggle.

"The government of our great western Ally is not only sending large numbers of American battalions to Europe during the coming critical months, but has agreed that such of its regiments as cannot be used in divisions of their own, shall be brigaded with French and British units so long as the necessity lasts. By this means troops which are not yet sufficiently trained to fight as divisions and army corps will form part of seasoned divisions, until such time as they have completed their training and General Pershing wishes to withdraw them in order to build up the American Army. Arrangements for the transportation of these additional forces are now being completed.

"Throughout these discussions President Wilson has shown the greatest anxiety to do everything possible to assist the Allies, and has left nothing undone which could contribute thereto.

"This decision, however, of vital importance as it will be to the maintenance of the allied strength in the next few months, will in no way diminish the need for those further measures for raising fresh troops at home, to which reference already has been made. It is announced at once because the Prime Minister feels that the singleness of purpose with which the United States have made this immediate, and, indeed, indispensable contribution toward the triumph of the allied cause should be clearly recognized by the British people."—*A. and N. Journal*, 6/4.

ORDNANCE AND GUNNERY

BRITISH AND GERMAN NAVAL ORDNANCE.—In 1890 the German naval administration created at Essen a special ordnance section which was responsible for designing and supervising the manufacture of guns for the Imperial fleet. Up to this time the design of such guns had been left to the factory, and there was no appreciable difference between the ordnance mounted in German ships and the pieces of corresponding caliber set forth in the Krupp catalogues. Under the new system, however, German naval ordnance was developed independently, and, thanks to the intense secrecy maintained, it is doubtful whether any really accurate particulars of these guns are known outside Germany. The 1914 edition of the *Taschenbuch der Kriegsschiffe* gave what purported to be a list of the guns used by the fleet, and the following details of the principal weapons are taken from this list, though there are reasons for doubting the accuracy of certain of the data:—

MODERN GERMAN NAVAL GUNS

Gun	Weight (tons)	Weight of shell (lb.)	Muzzle velocity (ft.-sec.)	Muzzle energy (ft.-tons)	Rounds per minute
15-in., 45-cal.	82½	1675	2920	99,000	(?)
12-in., 50-cal.	47	851	3084	56,660	1
11-in., 50-cal.	36½	661	3084	43,600	1½
8.2-in., 50-cal.	15¼	275	3084	18,170	3
6.7-in., 40-cal.	6.8	154	2756	6,452	5
5.9-in., 45-cal.	4.9	101½	2920	5,856	7

During the years immediately preceding the war the respective merits of British and German naval ordnance formed a topic of frequent discussion in the technical press of both countries. German writers insisted on the better qualities of Krupp guns compared with British, and particularly claimed an overwhelming superiority in lightness, durability and precision of fire. The Krupp 12-inch 50-caliber gun, it was pointed out, weighed only 47 tons, as against the British 12-inch 50-caliber model of 69 tons, which also had a lower velocity. It was alleged further that the British wire-wound guns lacked girder strength, and soon began to droop at the muzzle, which meant a falling off in accuracy. These and many other statements derogatory to British ordnance were assiduously circulated by the Krupp advertising agency, and brought forth rejoinders from gunmakers here. But as no really official facts could be given on either side, the controversy was more or less a barren one. That the German claims, though doubtless exaggerated from commercial motives, had some foundation in fact, was not denied by unbiased observers of ordnance progress. The past record of the Krupp works was a sufficient guarantee of the high quality of their products, and there was also the fact that, ton per ton, German naval guns cost considerably more than British. On the other hand, most of those foreign governments which purchased their naval armaments abroad showed a decided preference for British guns, and it speaks well for the reputation of these weapons that practically the whole of the navies of Japan and Italy, and numerous warships of the South American States, are armed with guns either built in England or constructed to English design.

The late Mr. F. T. Jane published, in 1912, an account of a marvellous "pneumatic loading apparatus," which, he declared, had been experimentally fitted in one of the turrets of the battle-cruiser *Moltke*. With this apparatus, it was claimed, the 11-inch guns could be loaded in six seconds. "The charges for both guns, in brass loading cases, come up in the middle between the two guns, the projectiles away to the right and left respectively. One movement puts in the projectile, a second the cartridge. What the Germans do with the cartridges after firing is not at all clear. . . . They only have it in one turret of one ship as yet, but people who compile laborious statistics

about relative broadsides may as well take note now as later on." Considering the weights involved, loading an 11-inch gun in six seconds would have been a remarkable performance, but unfortunately nothing further was heard of this wonderful invention. As all German guns up to the 15-inch use metal cartridge cases, the problem of disposing of the spent cases, which are very bulky objects, was solved in the earlier ships by sending them below in the returning hoist. In later vessels there are apertures in the rear turret wall, and it is supposed that the empty cases are got rid of in this way, just as the Japanese gunners at the *Yalu* pitched the spent cases from the quick-firers down the nearest hatchway.

The revival of interest in gunnery which was the outstanding feature of British naval policy at the beginning of this century had its counterpart in the German fleet. Prior to the dreadnought era and the coming into fashion of long-range practice, German tactics were limited in the main to extremely rapid fire at moderate ranges. Between 1896 and 1901 ten German battleships were launched, none of which carried a heavier gun than the 9.4-inch. They were armed with four of these weapons, in addition to eighteen 5.9-inch quick-firers. It was claimed for them that, in spite of their light main battery, they could deliver in a given time a greater weight of metal than any contemporary British battleship armed with four 12-inch and twelve 6-inch guns. The German theory that volume was of more importance than weight had, and still has, many adherents in this country. It was especially convincing when the prospective targets were, for the most part, ships with a large area of unprotected hull. In 1902 the nameship of the *Braunschweig* class was launched. In her the main battery was increased to four 11-inch and the auxiliary armament to fourteen 6.7 inch. As all these weapons were credited with a high rate of fire the ships were formidable enough on paper, though they were considered abroad to be over-gunned for their displacement. When the all-big-gun epoch set in, Germany kept to the 11-inch gun for her first quartet of ships, and then adopted the 12-inch for the next three groups—13 ships in all—though other nations were mounting larger weapons. Even in Germany protests were raised against the retention of this gun at a time when British ships with 13.5-inch armaments were passing into commission. The semi-official explanations published on this point may be summarized as follows: "The decision to continue arming German capital ships with guns of moderate caliber, *i. e.*, 12-inch, is the result of a careful survey of all the circumstances. Our industry is perfectly competent to produce guns quite as large and powerful as any foreign weapons if the necessity arose; but in the opinion of our principal naval officers it has not yet arisen. Most of our dreadnoughts are armed with the 12-inch 50-caliber gun, weighing 47 tons. This gun, compared with the 13.5-inch 45-caliber piece mounted in British ships, which weighs 76 to 80 tons, is equal in penetrative power up to all practicable ranges, and its shell is considered quite heavy enough for attacking any armored vessel now afloat. Ten of our 12-inch guns weigh 470 tons, whereas ten of the British guns represent a weight of 760 to 800 tons. There is also a proportionate saving in the weight of our mountings. We are thus enabled to use the extra displacement at our disposal by giving the ships better armor protection and by mounting a powerful battery of 6-inch guns, which most of the British ships lack. The best evidence that British guns are not equal in quality to ours lies in the fact that within six years the British authorities have introduced no fewer than five different types of gun into their fleet, *viz.*, 12-inch 45-caliber, 12-inch 50-caliber, 13.5-inch 45-caliber (1250-pound shell), 13.5 inch 45-caliber (1400-pound shell), and 15-inch 45-caliber. We, on the other hand, preferred to develop a single type of gun to the utmost limit of its power, and, avoiding the craze for mere size, succeeded in making our 12-inch model as formidable in all needful respects as foreign guns of 70 per cent more weight." Nevertheless, even Germany found it desirable, in 1913, to employ a heavier gun, and consequently her battleships of that year's program were armed with 15-inch weapons.

From 1904, gunnery training in the German fleet was very intensive and practical in character. In that year the target practice system was revolutionized; from a distance of 4000 to 5000 yards, the range was rapidly extended until, a few years later, ships were scoring good results at 8000 to 10,000 yards. The following results were given in the *Navy League Annual* of 1909: "To-day we have the *Deutschland* firing 17 rounds and scoring 15 hits with her 11-inch guns at 6000 yards when steaming at 15 knots (April, 1909); the *Braunschweig's* fore turret weapons making 11 hits in 12 rounds at 6500 yards, steaming at 16 knots (June, 1909); the *Gneisenau* shattering all previous German records with the 5.9-inch quick-firer by her performance off Swinemünde last August—40 rounds and 33 hits at 4500 yards. It was during the same run that a gunner of the *Gneisenau* fired 12 shots and scored 12 hits in 62 seconds with a 5.9-inch gun, not of the latest model." Three years before the war a German director apparatus was subjected to exhaustive trials by the *Elsass* and *Blücher* during a special cruise to the Faroes. Certain facts which leaked out about the results of this firing were submitted, after verification, to a British naval officer of high rank, who was inclined to be skeptical.

Besides increasing the individual power of the gun by enlarging the powder chamber, perfecting rapid loading gear, and paying great attention to the optical instruments for sighting and control at maximum ranges, the Germans were unremitting in their efforts to improve the quality of naval shell. It is to be feared that official circles here were not fully alive to the progress which had been effected in this very important respect. In 1912 Sir George Greenhill, the eminent ordnance expert, declared the Germans to be so far ahead that they should shortly have in use a 6-caliber shell. The "portmanteaux," or very long high-explosive projectiles, used by the Japanese in their war with Russia, were notoriously erratic in flight. This was due, not to erosion, but to the unsuitability of the rifling, the guns they were discharged from having been designed for short shell; and consequently the "portmanteaux" did not have sufficient rotation about the longitudinal axis to steady them. After long experiment, conducted at great expense, German artillerymen finally succeeded in throwing long projectiles to extreme range with absolute steadiness of flight. Having solved this problem they proceeded to develop a projectile which combined great penetrative power with a most destructive burster. This "Einheits-Geschoss," or "omnibus" shell, came into service in 1912, and in practice fulfilled every expectation. The importance of the projectile question has been repeatedly demonstrated in the naval actions of the present war. Had the German cruisers at the Dogger Bank action been bombarded with so-called "omnibus" shell, it is most probable that the *Blücher* would not have been the only victim. As it was, however, the stout armor of the *Seydlitz* was able to withstand most of the British lyddite shell that struck her.

War experience has justified the prediction that German gunnery would be found to be very accurate, particularly at the longer ranges. Salvoes fired from a great distance wrought great destruction at Coronel and Jutland. On the other hand, the almost purely mechanical nature of the German system betrayed itself at Jutland by the rapid deterioration of the enemy's shooting when his own ships came under effective fire. That scientific gunnery will become even more important in the future is the conviction of all who have studied the lessons of the war and are informed as to the present trend of ordnance development. Guns of unprecedented size and power are virtually certain to make their appearance, and improved methods of sighting and control may extend the extreme range to 30,000 yards, if not more. Under such conditions victory will, in all probability, rest with the side that registers the first hits, for no armor or subdivision is likely to be proof against the devastating effect of the ponderous projectiles of the future.—*Engineer*, 15/2.

THE GERMAN LONG-RANGE GUN.—Following the long distance bombardment of Paris there has been much discussion in army and navy circles over the possibility that a gun could be constructed capable of sending a projectile 74 miles, and in this discussion a number of officers prominent in artillery and ordnance and allied sciences have expressed varying opinions. One of the leading ordnance authorities of the United States Army, whose name is withheld for military reasons, when asked by a representative of the *Army and Navy Journal* to express his opinion whether such a gun could be built and of the possibilities claimed for the mysterious weapon which has been hurling projectiles into the city of Paris, replied:

"We have the authority of the official reports from Paris that the city was shelled from a point outside the allied line and we have the official statement from Berlin that such a cannon was in use. Assuming that such a gun has been built, it demonstrates the possibilities of modern explosives, gun construction skill and the science of ballistics. It is thought not to be impossible to construct a gun capable of throwing a projectile 74 miles; it is a problem in gun construction, involving developing an initial velocity as high as 6000 feet per second. It may even be possible that the range can be increased. It may be that the bombardment of London from the Flemish coast is the *raison d'être* for the construction of such a gun.

"All that is necessary to any particular velocity is to burn behind a projectile the proper weight of powder, and sufficient length of bore in which to properly burn the powder. A gun 35 calibers long of the old Coast Artillery type has an initial velocity of approximately 2000 feet. A gun of 50 calibers has an initial velocity of approximately 3000 feet. It may be considered that increasing length of gun by 15 calibers will give an additional thousand feet velocity, based on what guns have done in the past. Applying this rough rule it would seem possible to get the range indicated for the gun now bombarding Paris if this gun were 95 calibers long.

"It is only essential that the projectile, which in this case was apparently about 406 pounds in weight, should be backed by sufficient powder of the proper size of grain. Projectiles at present have behind them a weight of powder about one-third the weight of the projectile. The higher initial velocity could be obtained by the use of a greatly increased charge. It is, of course, essential that there should be ample space in the breech of the gun in which such a charge could be burned advantageously. It resolves itself, then, into a problem of interior and exterior ballistics; that is, the principles governing pressure and velocity within the gun, and elevation of the gun and muzzle velocity. Until comparatively recently it has been assumed that the maximum range possible would be obtained in firing a gun at 45 degrees elevation. But it is now known that the maximum range is given by an angle of elevation considerably greater than 45 degrees.

"It may be said that if the gun which is now firing on Paris is 9.5 calibers its length is about 80 feet. It is fired at an elevation greater than 45 degrees and the highest point of its trajectory will be above 25 miles. At such high altitude the resistance of the air is very small.

"At the celebration of Queen Victoria's Diamond Jubilee a projectile 9.2 inches in diameter was fired from an English piece at an elevation of 43 degrees. The projectile weighed between 500 and 600 pounds and the measured distance or range shown was about 12 miles. Under present conditions firing at a higher angle the same piece would probably throw its projectile much farther.

"One condition which has probably increased the range of this gun is the use of the thin steel air cap attached to the head of the projectile. This thin steel cap is hollow and is designed to reduce the resisting effect of the air. The gun may be built in two sections and joined after it has been emplaced. In this way many difficulties in transportation could be overcome. The principle of getting increased ballistic effect by extending the length of cannon is not a new one. It has been applied for many years. To prevent such a long gun from drooping toward the muzzle it is probably necessary to

support it in a cradle and perhaps to support the cradle by a truss. In this way it is a simple matter to preserve the rigidity of the gun and also to provide for certain necessary adjustments.

"The range of all cannon depends upon the length of the bore, the elevation at which fired, the proper weight and composition of the explosive and its proper combustion in a space sufficient to give it its full force."

The Bombardment of Paris.—The official announcement was made in Paris on March 23 that the city was being bombarded by long-range cannon. Fragments of shells found bore marks of rifling, which was taken to indicate that they had been fired from a gun, and this was further evidenced by the regularity with which they fell in the city.

A German official communication issued at Berlin on the night of March 24 said: "We have bombarded the fortress of Paris with long distance guns."

An official report on March 25 from United States Ambassador Sharp at Paris said: "The enemy has fired upon Paris with a long distance gun since 8 o'clock this morning every quarter of an hour and 40 shells have reached the capital and suburbs. There are 10 dead and about 15 wounded. Means to combat the enemy gun are in course of execution."

According to unofficial report it was believed in Paris that a German "monster cannon" had been located in the Forest of St. Gobain, west of Laon, approximately 76 miles from Paris. The gun bombarded Paris the greater part of the day on March 24, shells falling at intervals of from 15 to 20 minutes, until about 1 p. m. Bombardment was resumed next day, only a few shells falling, and none has since been reported. Berlin announced on March 25: "In the evening we bombarded the fortress of Paris with long-range guns."

A dispatch to the *Exchange Telegraph* from Copenhagen said: "The bombardment of Paris by a long-range gun was a great surprise to Germany as to other parts of the world. The Berlin *Vorwaerts* says that had the statement not been officially confirmed it would have been considered an unusually heavy war lie."

Paris took the bombardment very calmly, and as indicated by Ambassador Sharp's dispatch, little material damage was done. All experts agree that at such a tremendous range even approximate accuracy is out of the question, and therefore the gun is of use only where a target is presented on a vast scale, like Paris. The object aimed at is moral effect rather than material, but in both respects the gun is likely to prove less effective than airplane raiders.

The latest details concerning shells that have fallen in Paris appear in an article in *L'Homme Libre* of Paris, dated March 27. As cabled by the Associated Press, it says: "The caliber of the shells that are being fired is 8.8 inches and the length of the shell is 20 inches. The shell weighs 200 pounds and contains less than 20 pounds of explosives. The shell is provided with a fuse protected by a threaded stopper, and has a diaphragm inside which divides the shell into two compartments of unequal size. Two holes in the diaphragm afford communication between the two pockets. These facts are accepted as an explanation of the two explosions which on occasion have followed in quick succession and which led to the belief that two guns were firing."

Lieut. Col. J. E. Munroe, Ord., N. A., commandant of the Watervliet Arsenal at Watervliet, N. Y., where the largest pieces of ordnance for the United States Government are constructed, is quoted by the *New York Times* as saying that America had a gun capable of hurling a 16-inch shell 59 miles if some sort of carriage could be invented which would allow an elevation of 45 degrees and still withstand the shock of the tremendous recoil. It would be comparatively easy for us to manufacture a gun which would shoot 59 miles, said the colonel. In fact, there are several in commission that could throw a shell that distance if we had a carriage on which

they could be elevated 45 degrees. The trouble is, no one in the United States has ever devised a carriage that would permit that degree of elevation and survive the shock of the discharge. Personally, I do not think it would be worth much to us to have such a carriage, for its cost would be tremendous, and the damage a gun would be likely to do at such a distance would be entirely out of proportion to the cost. Remember, American coast defence guns have all been constructed with the idea of defence against ships, not cities, and the chances of hitting a ship 50 miles away would be negligible."—*Army and Navy Journal*, 30/3.

GIANT GUN OF GERMANS MADE AT KRUPP WORKS.—The gun with which the Germans are bombarding Paris is a product of the Krupp works at Essen. Emperor William has sent a telegram of thanks to Dr. Krupp von Bohlen and Halbach, the head of the Krupp works. The telegram reads:

"By the bombardment of Paris from a distance of considerably more than 100 kilometers, your new gun has brilliantly stood the test. By the manufacture of the gun you have added a new page to the fame and history of Krupp. I therefore express to you and all your co-workers my imperial thanks for this achievement of German science and labor."—*Evening Star*, 3/28.

SOME DETAILS OF GERMAN LONG-RANGE GUN.—The long-range German gun that began bombarding, continues intermittent attacks. No unexploded shell from the gun bombarding Paris has thus far been found. However, there have been examined in the municipal laboratory fragments of sufficient size to permit the directors to reach certain conclusions. They are of the opinion that a double fuse is used, and that the guns fire 210 mm. (8¼-inch) shells. Apparently four guns are being used, two on each alternate day. The tubes of the guns, which are rifled, are more than 60 feet long. The installation and adjustment of the guns must require at least three months. Doubtless they are concealed under mountains of cement, rendering it most difficult to find and destroy them. Lieutenant General von Rohne, a German authority on ordnance and inspector of artillery, gives in a magazine of which he is editor, details in regard to the long distance German guns with which Paris is being bombarded, according to a Geneva dispatch of March 31. He says they are 20 meters (65½ feet) long. The empty shell weighs 150 kilograms (330 pounds) and the charge weighs the same. The projectile attains a height of 30 kilometers (18.6 miles). An official announcement made in Paris on April 2, stated that "one of the German long-range guns bombarding Paris burst, according to prisoners captured on the French front, five of the gun crew being killed."—*Army and Navy Journal*, 6/4.

SUBSTITUTE FOR T. N. T.—Owing to the great demand from both the army and the navy for the standard high explosive, T. N. T., or tri-nitro-toluol, the bureau has decided to use a new substitute product which promises to be satisfactory and of which an ample supply seems available, to supplement the output of T. N. T., and make greater quantities of the latter available for army use.—*Official Bulletin*, 9/4.

COMPLETION OF NAVAL 16-INCH GUN.—The first year of war saw the completion of the latest type of naval 16-inch gun throwing a projectile weighing 2100 pounds. Our newest battleships will mount them. At present our largest battleships mount 14-inch guns, which throw a projectile weighing 1400 pounds.—*Official Bulletin*, 9/4.

TESTS SOON TO BE MADE OF 16-INCH GUN.—It is stated that a 16-inch 50-caliber test gun is practically completed at the Washington Navy Yard, and that it will be proved within the next two months. Twelve of these powerful pieces will form the armament of the new 42,000-ton, 23-knot,

American battleships. The bureau has ascertained that the life of the large caliber gun has been underestimated, the 14-inch 45-caliber gun having been fired a number of rounds far in excess of that heretofore considered to be practicable. The *Scientific American* presumes these good results are largely due to the most excellent powder, which, being a pure nitro-cellulose powder, has much less erosive action than those containing more or less nitroglycerin. This is a most valuable quality, for it will mean that the new 16-inch 50-caliber gun, above mentioned, can be given a velocity considerably greater than would be possible with some other powders, such, for instance, as the English cordite.—*Engineer*, 15/2.

RECENT DEVELOPMENTS IN MARINE LIGHTING.—All the systems in use for unattended lights combine with the lighting apparatus some method of sound signalling, the whistling buoy being one which has found considerable

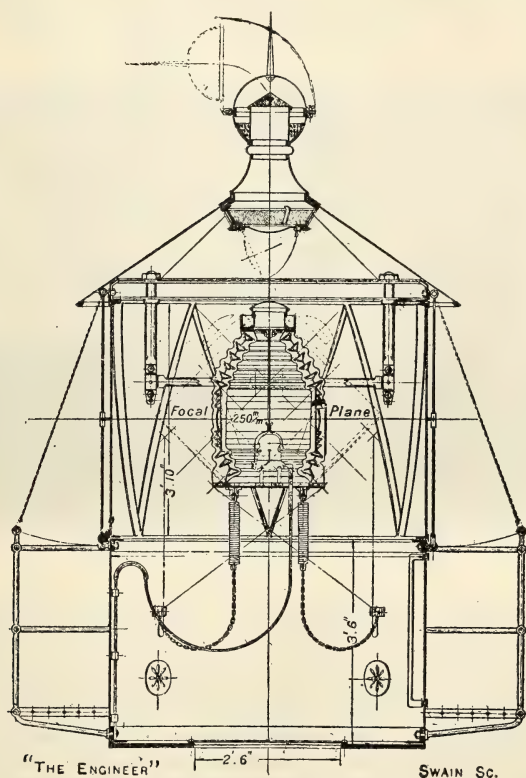


FIG. 8.—Lantern of Unattended Lightship.

application. An air-chamber is formed in the center of the buoy and is connected with the sea by means of a tail pipe of mild steel. In this pipe the imprisoned air is compressed by the action of the waves and operates a whistle placed inside the structure which supports the light, the necessary air inlet pipes with self-acting non-return valves being provided. The usual type of whistling buoy is the Courtney. From the lower end of this buoy

a large tube descends about 30 feet, the object being to reach a depth where the water is unaffected by surface movements; inside the tube the water rises to the mean level of the sea. As the buoy rises and falls by the action of the waves, there is produced an alternate inhaling and exhaling of air; this air is made to impinge on the edge of a whistle which produces a loud deep sound heard, under favorable circumstances, over a distance of five miles. An alternative design is the bell buoy, but it is not nearly so efficient as the whistling type.

There are several methods of operating fog signals on beacons. It is now five years since an automatic acetylene fog gun was introduced by Messrs. Stevenson at Dhuheartach Lighthouse. This gun is claimed to have great advantages over the ordinary tonite explosive signal. It is entirely automatic and fires as frequently as four times every minute, whereas the tonite apparatus can hardly fire more often than once in five minutes and requires constant attendance. Two fog guns have been installed on the *Clyde* at Roseneath Beacon and at Fort Matilda pier, the operating station being at Gourrock pier. Wireless methods of operation are adopted. When

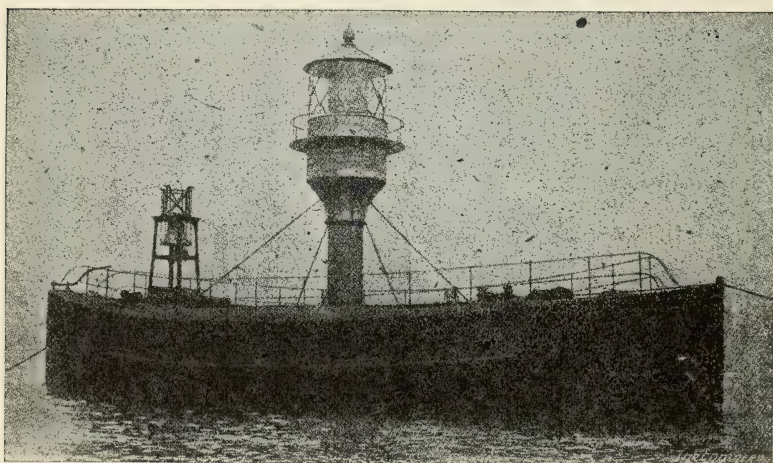


FIG. 9.—Unattended Lightship.

fog appears, an aerial at Gourrock, by a series of sparks transmits energy to aërials on the beacon and at Fort Matilda, thereby completing the circuits of the local batteries. This operation switches on the fog signal. The guns once they are set in action work automatically, giving reports at pre-determined intervals, which can be heard in favorable weather over a distance of three miles. The guns are supplied with acetylene in measured quantities, the gas being mixed with the necessary proportion of air to produce a good explosive mixture. This application of wireless to other than communication purposes is an important step in the field of marine lighting and signalling. A small optical apparatus only is erected on Roseneath Beacon, which is primarily intended to carry a fog signal, but a gas-lighted buoy has been placed at the edge of Roseneath Patch.

It would seem that there is an opportunity for establishing a considerable British industry in the manufacture of welded buoys, which before the war were made almost entirely in Germany.

A good deal of work has been done recently in the development of the unattended lightship, chiefly up to the present in Scotland and France. One

of the earliest unattended lightships, if not the earliest, was laid down at the Otter Rock by the Northern Lighthouse Board. These ships are more effective than buoys, as they carry a more powerful light at a greater elevation, while the large expense of a lightship manned by a crew is avoided. The vessels cost at pre-war prices £3000 apiece, while an ordinary attended lightship costs about £12,000, and the maintenance is reduced from £1500 per annum to a mere fraction of this sum. They cannot, however, give so effective a fog signal as can a fully manned lightship. These unattended vessels have hitherto chiefly been illuminated by means of compressed oil gas.

The Australian Government has just had constructed four unattended lightships to the design of Messrs. D. and C. Stevenson, Edinburgh. The type of vessel for this service is shown in Fig. 9. They are specially designed for very exposed situations on the Queensland coast, and are illuminated by

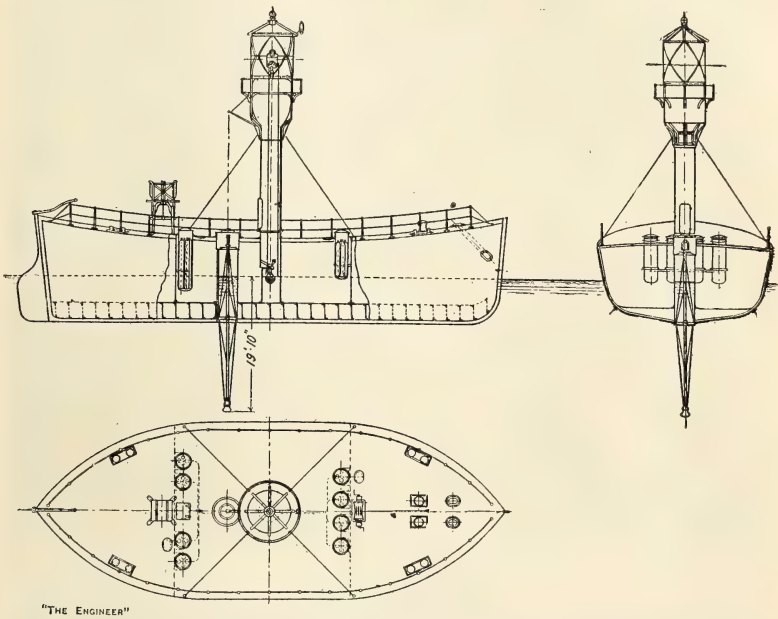


FIG. 10.—Plan and Sections of Unattended Lightship.

means of dissolved acetylene. The vessels are equipped with bells rung by the motion of the ship and have optical apparatus supplied by Messrs. Chance, giving a group flashing light of 1500 candle-power with three flashes in quick succession every 15 seconds. The lighting apparatus—see Fig. 8—is supported in a gimbal frame which allows of a swing of 45 degrees from the vertical on either side. The gimbal is fitted with ball bearings for the trunnions, and is secured to a cross girder attached to the framing of the lantern roof. The trunnion bearings are fitted with locking pins for use when required. The lantern is 5 feet in diameter inside the glazing. The framing is of gun-metal of the helical type, the roof being of copper. The lower portion of the lantern is constructed of mild steel plates and angles, and is fitted with a steel door for ingress from the external gallery. Bird screens of copper wire netting are fixed to the outside of the glazing. The lanterns have been specially designed for service in the cyclone area, and

particular care has been made to prevent cross and down drafts, so that the pilot lights of the burner may not be extinguished. Owing to the prevalence of very minute insects, every opening of the lantern is covered with the finest copper wire gauze. The high pressure tubing from the acetylene cylinders to the lantern is of mild steel, tinned on the interior and is connected to the flasher by a length of rubber tubing. A pressure reducer is fitted between the rubber tube and the steel pipe. The intensity of the beam from an apparatus of this type with a three-jet burner is about 1500 candle-power.

The Aga pendulum lens for an unattended lightship is illustrated in Fig. 10. The spindle of the lantern is carried by a universal joint provided with ball bearings in place of the edge bearings generally used. The upper balance weight is carried upon special bars which, without interfering with the light, relieve the lens frame of all stress. The main object of the pendulum is to secure a large moment of inertia, in order to obtain as long a period as possible, and to prevent the oscillations of the lantern coinciding with the motion of the vessel. Thus the lower balance weight is made adjustable in the vertical direction, and at the same time it is also adjustable in a horizontal direction, in order that the spindle shall hang absolutely vertical.

Incandescent oil burners on comparatively a new system have been introduced by Messrs. Chance Bros. to replace compressed oil gas or acetylene in light vessels, the effect being not only largely to increase the candle-power, but to effect economy in first cost and in expense of upkeep.

In addition to the unattended lightship, the unattended lighthouse and fog signal is also a feature of recent practice. There are many of these installations now working, that at Platte Fougère, which was described in *The Engineer* for April 8, 1910, being probably still the best example of the kind in existence. This light is placed in the Little Russel Channel at the entrance to St. Peter Port, Guernsey, on an isolated rock known as Platte Fougère, where the prevailing conditions preclude the possibility of keepers living in the tower. The light is an automatic acetylene gas plant, the gas being stored in cylinders and the light turned on and off by a clock-work arrangement. The fog signal is electrically operated, current being supplied from the shore by means of a submarine cable. The fog signal is the important part of the project, the light being quite subsidiary. The experience gained with this installation has shown that for inaccessible situations where a sound signal and light are necessary, the method followed is particularly suitable, while the cost is quite small in comparison with that of a lighthouse establishment.

ENGINEERING

FIELD OF INTERNAL COMBUSTION ENGINE.—The use of the internal combustion engine using oil-fuel has lately increased to a very considerable extent, and has become a formidable rival to the steam engine in practically all vessels where powers of under 10,000 horsepower can be employed. The liner, the battleship and the destroyer are about the only three types of ships in which the oil engine has not been applied. The high-speed turbines and water-tube boilers of the destroyer are far less in weight per horsepower than Diesel engines, and in the case of larger ships even where the item of keeping down the weight is not the greatest essential, oil engines have not been built in sufficiently large units to give satisfactory service. This narrows the field of the oil-engine-propelled vessel down to six classes of vessels, *i. e.*, the submarine, the bulk freighter, the small passenger boat, the shoal-draft river boat, the motor tug and the yacht.—*Marine Engineering*, April.

FISH OIL FOR MOTOR-BOATS.—Experiments made in Denmark with motors for fishing boats to determine the practicability of using fish oils for operating them, appear to have been so successful, according to Commer-

cial Attaché I. W. Thompson, that it may be possible for the fishermen who now have boats equipped with kerosene motors to make some slight changes and use this kind of fuel. It is even proposed, he says, that fishermen may make their own cod liver oil while at sea for use in their motors.

When the experiments were called to the attention of the manager of a Copenhagen firm, which makes Diesel engines for the purpose of getting his opinion regarding them, he replied to Mr. Thompson: "I take pleasure in confirming that the fish oil for Diesel motors will be excellent to use as a moving power. Further, I beg to say that, no doubt, the said oil will also be practicable for smaller fishing boats where the motors do not work according to the principle of Diesel motors, but the principle of explosive motors."—*N. Y. Times*, 3/24/18.

FIGHT FOR NAVAL OIL.—The naval authorities are continuing a desperate fight for the protection of public lands that will yield an adequate source of supply of oil, which is essential as a fuel for the naval establishment. In the recent hearings before the House Public Lands Committee Commander N. H. Wright, U. S. Navy, who has specialized in engineering and who is on duty in the bureau of steam engineering with special reference to the naval reserves, has plainly stated the position of the Navy Department. If pending legislation, which has threatened to deprive the naval service of its source of oil-fuel supply, is enacted, it will become necessary to resort to special legislation authorizing the commandeering of oil-fuel plants and property. Commander Wright informed the committee that since the war foreign countries have done a great deal more than previously toward obtaining a supply of oil which could be depended upon. There is little doubt in the minds of the military-naval experts concerning the object of the Roumanian drive of the Germans, in which there was such a big loss of life on both sides, and which was due largely to the urgent German need for oil obtainable from the Roumanian oil fields. The Mexican situation has caused a great deal of anxiety as to the holding of the oil fields in that country, furnishing an illustration of the value of absolute control in this country of a supply of oil. On account of the war, the increase in the number of oil-burning destroyers, and the acceleration of the building program, the Navy Department has revised previous estimates of the navy's oil needs. It is now estimated that the fuel oil requirements of the navy will be as follows: For the fiscal year ending June 30, 1918, 5,000,000 barrels, if at war; for the fiscal year ending June 30, 1919, 8,635,000 barrels, if at war; for the fiscal year ending June 30, 1920, 16,635,000 barrels, if at war; for the fiscal year ending June 30, 1921, 5,854,000 barrels, if at peace; for the fiscal year ending June 30, 1922, 6,574,000 barrels, if at peace. During the fiscal year ending June 30, 1917, the navy's consumption of fuel oil was 2,079,580 barrels, valued at \$2,529,212.53, and its consumption of gasoline was 1,937,858 gallons, valued at \$437,542.80. Fuel oil consumption has thus increased 15 fold since the fiscal year 1911, when only 137,587 barrels were required. There are now 119 oil-burning vessels in commission; 25 more were building prior to the 1917 program, and 154 are included in the 1917 program. There are in addition ships of various classes building for the emergency, the number of which is not disclosed. The world's available supply of fuel oil as it affects the United States is Mexico, the Caribbean countries, South America, and the Philippines. It is probable that a large portion of our peace supply for the future will come from Mexico, but it is only possible to depend upon a foreign source when there is a reserve which can be made use of at the time when this foreign source may be cut off, in case of war or internal disturbances.—*Army and Navy Register*, 6/4.

BITUMINOUS SCHIST AS FUEL.—Experiments conducted in Montevideo, Uruguay, to discover the practicability of bituminous schist as a substitute for fuel oil in electric plants, show that there are 9500 calories per cubic

meter in the schist as compared with 10,000 in fuel-oil. According to Chargé d'Affaires Craig W. Wadsworth in Montevideo, the oil obtained from bituminous schist has been tried with good results in semi-Diesel engines.—*N. Y. Times*, 4/7.

OIL PROOFING CONCRETE OIL TANKS.—Owing to the scarcity and high price of steel plates, many oil companies have adopted concrete oil tanks. These from a structural point of view are in every way suitable for the purpose, besides being considerably less expensive than steel tanks.

The one difficulty so far has been to make them entirely oil proof, particularly, those in which gasoline is stored. The International Compositions Co., Inc., of 18 Broadway, New York City, have in conjunction with their parent company in Great Britain, manufactured and supplied oil proofing materials for kerosene, gasoline, etc., during the last 30 years, and they have now perfected a method by which these materials can be efficiently used for oil proofing concrete tanks.

It has been known for some time that certain paints are insoluble in gasoline, benzol and other hydro-carbons, but the difficulty so far has been to get a sufficient penetration into the structure of the concrete, so that any surface damage may not remove the paint and cause leakage. The International Compositions Co., Inc., have now succeeded in adapting their material, so as to obtain a penetration of insoluble gums to the extent of about one-third of an inch into the structure of the cement, with the result that any surface damage of the paint will not impair the resistance against leakage. The material which they use will not affect the structural strength of the concrete in any way. It is, therefore, entirely suitable for this purpose, and should have a considerable sale in the near future, while the scarcity of steel plates for tank construction continues.—*Shipping*, 23/3.

WELDING SHIP PLATES AT HOG ISLAND.—A process of welding the steel plates of the ships to be built at Hog Island and at other shipyards, instead of riveting, is under consideration by the Emergency Fleet Corporation, according to Francis T. Bowles, former chief constructor of the navy. A British naval construction officer, Captain Caldwell, is now in Philadelphia for the purpose of instructing workmen at Hog Island and at other ship schools in the country, in this method of shipbuilding, says *Shipping*. Mr. Bowles states that although the process of electric spot welding in shipbuilding is as yet only in the experimental stage, he thought the plan feasible. The Fleet Corporation now has a group of instructors at Schenectady, training them for use in this work at Hog Island. The corporation has arranged for the construction of machines for spot welding also, but the extent to which it can be used is still in the experimental stage.—*Army and Navy Journal*, 5/4.

THE EFFECT OF MINES AND TORPEDOES ON MERCHANT SHIPS.—In May of last year, the Council of the Institution of Naval Architects issued, as a confidential paper, a report on the "Effects of Explosions of Mines and Torpedoes on the Structure of Merchant Vessels." The principal recommendations were embodied in a notice to shipowners and masters, and circulated by the Board of Trade in June. The admiralty has just consented to the publication of the report.

Your committee have thought it desirable to issue a preliminary report containing suggestions for certain temporary war expedients which might be adopted at very little expense in the ordinary type of cargo vessel, and which they are of opinion would have the effect of greatly increasing their chances of safety after being mined or torpedoed, provided that only one main compartment is opened up to the sea.

The committee, having examined the information placed at their disposal by the Admiralty and the Board of Trade, are of opinion that the loss of many of these vessels has been due to three causes:

(a) The existence of water-tight doors low down in the bulkheads, which could not be closed after the explosion.

(b) Fractures of suction pipes in the attacked compartment, permitting water to flow into adjacent compartments.

(c) The penetration of bulkheads adjacent to the attacked compartments by fragments of plating, frames, rivets, etc.

A large number of cargo vessels have four main holds and six bulkheads arranged as follows: No. 1, collision bulkhead; No. 2, between Nos. 1 and 2 holds; No. 3, at fore-end of boiler-room; No. 4, at aft end of engine-room; No. 5, between Nos. 3 and 4 holds; No. 6, at aft peak.

With fewer bulkheads than this the chances of keeping a vessel afloat are very much reduced.

Taking this six-bulkhead arrangement as a typical case, the recommendations of the committee, as applied to cargo ships with six or more bulkheads, are as follows:

1. All existing water-tight doors low down in main bulkheads should be closed up and so secured that they cannot be opened. If water-tight doors are necessary, they should be fitted high up in the bulkhead.

This is particularly important when bunker coal is carried forward of the boiler-room bulkhead, as a water-tight door through which coal is being trimmed cannot be depended upon.

2. The water-tight door to the shaft tunnel in the engine-room bulkhead should be closed up and so secured that it cannot be opened, access to the tunnel being provided by means of a water-tight trunk carried up to the bulkhead deck.

Cases have occurred when the engine-room has been flooded too quickly to permit of the tunnel door being closed, with the result that considerable quantities of water have entered the after holds through the tunnel, which was not sufficiently water-tight.

An explosion in one of the after holds would be likely to injure the tunnel, resulting in the flooding of the engine-room and boiler-room, unless the tunnel door is closed as proposed.

3. The tunnel, or any other longitudinal passage below the water-line, should be thoroughly water-tight.

4. Each suction pipe, where it enters the compartment from which it drains, should be provided with a screw-down non-return or other suitable valve, which can be worked from the bulkhead deck. These valves should be kept closed at all times, except when the pumps are in use.

5. The amount of injury which the bulkheads might receive from flying fragments will depend greatly on the nature and amount of cargo in the hold.

If the hold is well filled the risk of injury is much less than when partly filled or empty. If the cargo is of a heavy nature the upper parts of the bulkheads will probably be exposed.

It is recommended that, wherever possible, the bulkheads should be protected temporarily by means of timber or other suitable material, forming a splinter screen. In some cases the cargo itself could be utilized for this purpose. The necessity for some protection of this sort is particularly great in the case of ships in ballast.

Very little time and money would be expended in giving these measures of protection to a large number of cargo vessels.

These vessels having more numerous bulkheads in proportion to their length than the ordinary cargo steamer already reported on, should be better able to withstand attack from mine or torpedo.

On the other hand, many mail and passenger steamers have water-tight doors in the 'tween decks giving communication through the water-tight bulkheads between passenger and other spaces. They have also side scuttles for ventilating cabins, and numerous sanitary discharges very near the water-line. These are liable to be submerged and to admit water, should the scuttles be open or the controlling valves to the baths, water-closets, etc.,

be inefficient. This liability will be greater in the case of vessels having small initial stability or possessing longitudinal bulkheads, if damage occurs in way of such bulkheads. In some vessels also there are passages leading through bulkheads in the ship's hold to allow the firemen and greasers to gain their quarters without traversing any of the passenger decks. All these features have proved to be sources of danger.

Further, the hatchways in such vessels are relatively small, and do not afford such instantaneous relief from air and gas pressure resulting from an explosion as in the case of the larger hatchways of cargo vessels. For this reason it is considered that bulkheads in the neighborhood of the explosion are more liable to distortion in mail and passenger vessels than in cargo ships, and that water-tight doors on such bulkheads cannot be relied upon to close after an explosion. Devices for closing doors from the bridge are likely to fail, both by reason of the above-mentioned distortion and because of the probable destruction of the hydraulic or electric mains provided for the purpose in the region of the explosion.

In view of the foregoing it is suggested that the following measures be adopted in existing vessels during the continuance of the war:

1. The disuse of all firemen's passages and the closing up of all doorways in bulkheads traversed by them when below the bulkhead deck, the firemen passing to and from their quarters by way of an upper deck, where a temporary screened passage could be provided if necessary.

2. All openings from the engine-room into shaft tunnels to be abolished and access to tunnels provided through trunks abaft the engine-room bulkhead; these trunks to be water-tight to the bulkhead deck.

3. All water-tight doors in transverse bulkheads throughout the machinery spaces to be closed and so secured that they cannot be opened, provision being made for efficient supervision in each separate compartment. If this is deemed impracticable in certain cases, it is recommended that in such cases the doors on the level of the stokehold and engine-room floors should be closed and others fitted as high up as possible on these bulkheads.

4. All water-tight doors in transverse bulkheads on decks below the bulkhead deck to be closed and so secured that they cannot be opened, additional exists to the decks above being provided where necessary.

5. All side scuttles situated below the first deck above the bulkhead deck should be closed up and sealed. Special fan ventilation is to be provided if necessary for the cabins affected.

6. Each suction pipe where it enters the compartment from which it drains should be provided with a screw-down non-return or other suitable valve which can be worked from the bulkhead deck. These valves are to be kept closed except when the pumps are in use.

7. Where ventilation trunks, etc., pass through water-tight bulkheads below the bulkhead deck, valves operated from above that deck should, in all cases, be fitted at the bulkheads, and if any trunk pierces the bulkhead at a low level it is strongly recommended that a new lead should be devised to carry it through the bulkhead at as high a level as possible.

8. Valves on all sanitary discharges at the ship's side should be such as will prevent water passing inboard through them when the vessel has considerable trim or list. These valves should be frequently examined and kept in good order.

9. Any ash or rubbish shoots, etc., having upper ends opening on decks below the bulkhead deck should be provided with water-tight covers, and instructions should be issued to ensure that these covers are always in place when the shoots are not in use.—*Engineering*, 22/3.

PLANING MACHINES OF CONCRETE.—We read in *The Iron Age*, New York, that two gigantic metal planing machines, the principal parts of which will be of monolithic reinforced concrete construction, this including the beds, housing of plattens, with cast iron for bearing surfaces, are being built by the Amalgamated Machinery Corporation, Chicago. The work of

the machines is the planing of beds for long gun-boring machines. The concrete beds of the planes are 184 feet in length; the platens are 90 feet long and 13 inches thick. The width between housings is 72 inches, and the cross-rail, which is stationary and faced with cast iron, is 4 feet square. They will plane 36 inches down to 20 inches.—*Engineering*, 22/3.

DIE-CASTING OF ALUMINIUM-BRONZE.—*Die-Castings* may be defined as "finished castings, made by pouring molten metal, flowing by gravity or under other external pressure, into a metallic mould."

Advantages of Die-Casting.—Some of the advantages of die-casting are:—

1. The accuracy and uniformity of the castings. They can be made to specification 0.005 per inch, or even less for small parts.

2. Machining costs are either eliminated altogether or are greatly reduced.

3. The process is continuous, and the output is generally much greater than is the case with sand-casting.

4. Articles which it would be impossible to sand-cast may be successfully die-cast.

Although the process has been in operation for over 20 years, it is only during the last 10 years that it has assumed importance as a separate industry, and this is largely due to the development of the automobile and aeroplane.

Metals Employed.—The alloys employed may be divided into five classes, according to whether the principal constituent is (1) zinc, (2) tin, (3) lead, (4) aluminium, (5) copper.

Owing to their low melting-points, alloys of the first three classes were initially employed, but the castings lacked strength and rigidity. An average zinc base alloy has a tensile strength of about 8 tons per square inch, with practically no ductility, but these alloys are very liable to corrosion and distortion.

The tin and lead-base alloys include a large number of the "Babbitt" or bearing metal type, and many bearings are now being die-cast.

The low specific gravity, cheapness and strength (when alloyed) of aluminium, have been the principal factors in its development as a die-casting metal. The chief drawbacks are:

(1) Its high melting-point (compared with lead, tin, and zinc).

(2) Its tendency to attack iron when molten.

(3) Its high shrinkage.

(4) Its weakness at high temperatures.

On account of (2) the "plunger" type of machine has been largely superseded by one employing air-pressure, or by utilizing the pressure of the riser or gate. A die using zinc-base alloys lasts almost indefinitely, but, when using aluminium alloys, cracks begin to show after 2000 or 3000 castings have been made. The high shrinkage of aluminium has been reduced by alloying, and need not exceed about 1.4 per cent.

The weakness of the alloys at high temperatures is responsible for the formation of cracks which develop while the metal is solidifying in the mould. Thus the strength of the copper-aluminium alloy containing, say, 12 per cent copper drops from 8 tons to 10 tons per square inch at 0 deg. C. to 3 tons to 5 tons at 350 deg. C.

Notwithstanding these drawbacks, aluminium alloys of very variable composition are being successfully die-cast on a large scale.

Brass and Bronze Die-Casting.—The next step in the process was to surmount the difficulties connected with copper-base alloys, which have a much higher melting-point. The literature on the subject is as yet very scanty, but most of the workers in the field express the opinion that brass or bronze die-casting is almost a commercial impossibility. On reading the accounts of the work done by the Doehler Die-Casting Company,

Work, Webber, Schulz, Pack, and Norton, one arrives at the following conclusions:

1. The chief difficulty in the process is the high temperature (900 deg. to 1000 deg. C.) for casting "yellow metal." This has several effects. The zinc in the brass attacks the steel die, which rapidly deteriorates, so that no more than 1000 castings can be obtained. The high shrinkage of brass sets up strains within the die which further impair its accuracy. Since the die cost (anything from 5*l.* to 200*l.*) is the prime factor in die-casting, this is a serious matter. For the same reason it is impracticable to use an iron container for the molten metal, as the alloy would rapidly become contaminated thereby; hence air-pressure cannot be employed to force the metal into the die. This means pouring from the crucibles, with consequent slowing down of production, if (as is often necessary on account of expense) only one die can be used. Another consequence of the high temperature and slow pouring is the large amount of dross which is formed. Also ordinary brasses are not sufficiently strong at high temperatures to withstand the shrinkage strains which are set up.

2. It is very difficult to produce brass die-castings which are consistently free from blowholes or shrinkholes. The former are caused by air being entrapped in the mould, and they cannot be overcome by simply increasing the pressure in the mould or by carrying out the process *in vacuo*. By a careful study of the venting and gating of each part, however, this unsoundness may be practically eliminated.

3. Brass and bronze die-castings are only a commercial success if the parts cannot be completely produced by automatic machinery, or when they obviate numerous difficult machining operations, involving different settings of tools. To compete with the machined products the die-castings must be rapidly made, must be accurate to within ± 0.002 per inch, and must have a smooth polished surface. Recent developments in foundry and machine shop practice have made it possible for many parts to be now more cheaply sand-cast, and "yellow" metal die-casting is "practically restricted to pieces of fairly simple shape, weighing between $\frac{1}{2}$ oz. and 3 lb."

The experiences of the authors in this connection have been chiefly in the use of brass (60:40) containing about 2 per cent aluminium; manganese brass; and "aluminium-bronze" containing iron. In the first case, the aluminium is added to give fluidity to the metal and better definition to the castings. In the second case, manganese brass of usual composition is used, containing less than 1 per cent manganese, with a little iron and aluminium. The chief objection to these metals is that the surface of the die becomes rapidly covered with a coating of zinc oxide, which must be brushed off after every cast or the definition is spoiled. Various methods have been tried to overcome this difficulty, but so far without complete success. Our best results, however, have been obtained with "aluminium-bronze" containing iron. The first alloys experimented with were of copper-aluminium containing about 10 per cent aluminium, the balance being copper. The results were disappointing, for the metal did not lie so "kindly" to the surface of the die as it might have done, and the definition of the edges was poor. After repeated trials it was decided to add a little iron, when much better results were obtained.

In their masterly research on the copper-aluminium alloys Carpenter and Edwards* brought the investigation to a point "where the way is clear for investigating the influence of a third metal." Rosenhain and Lantsberry,† in their introduction to the Ninth Report, discuss the reasons which led to the selection of manganese as the third metal, and it is rather singular that iron does not seem to have been considered as even a possibility. Vickers‡

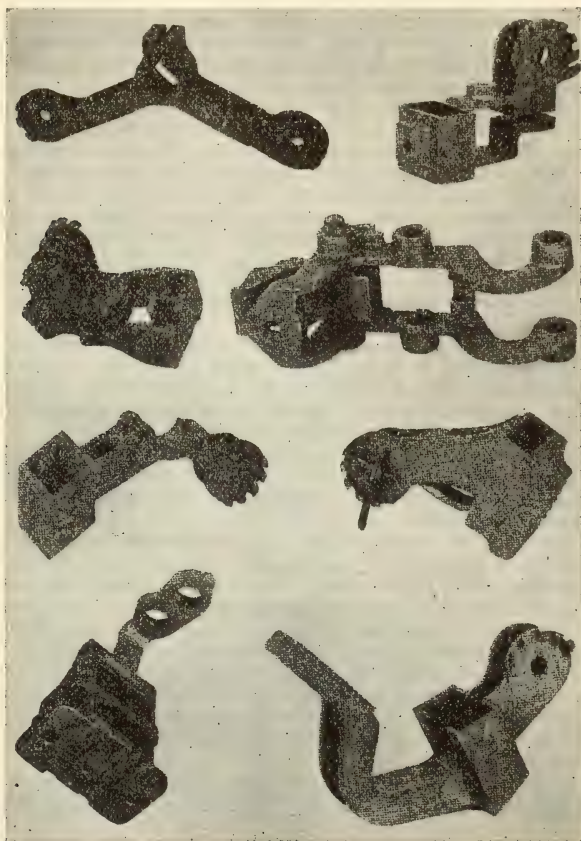
* Carpenter and Edwards, "Eighth Report to the Alloys Research Committee," 1910.

† Rosenhain and Lantsberry, "Ninth Report to the Alloys Research Committee," 1907.

‡ *Mechanical World*, August 17, 1917.

alludes to the prejudice which appears to exist in the minds of most foundry-men against iron in copper alloys, probably due to its harmful effect when present in brass in any quantity. He also states that the use of iron in "aluminium-bronze" is no new thing, but has been common in Germany and the United States for some years. While claiming that it improves the metal for sand-casting, he questions its use in die-casting, for the following reasons:—

1. In sand-casting it is necessary to add iron in order to prevent the "excessive crystal growth" which is "such a drawback to the 10 per cent aluminium-bronze."



EXAMPLES OF ALUMINIUM BRONZE DIE-CASTING WORK
FROM IRON DIES.

In die-castings this is not necessary, as the chilling effect of the die is sufficient to keep down this growth.

(That the iron has this effect was shown by Corse and Comstock. § Combined probably with aluminium and copper the iron is the first constituent to separate out, in the form of small black crystallites, which form nuclei round which the α -solution crystallizes, thus reducing the grain size.)

§ Transactions of the American Institute of Metals, September, 1916.

2. Iron accentuates the shrinkage of the bronze, consequently increasing the tendency to form the pear-shaped cavities commonly found in aluminium-bronze die-castings.

The authors do not agree with the above conclusion limiting the usefulness of copper-aluminium-iron alloys to sand-castings, having produced many thousand die-castings, in these alloys. The cavities referred to are certainly a difficulty to be overcome. They are either shrink-holes, caused by the large contraction of the metal, or blowholes caused by air being entrapped in the die by the molten metal, and they may be detected in a casting by finding its specific gravity. Their direction is often radial, and they may be colored black inside. In either case, they may be practically eliminated by a careful study of gating, venting, etc.

Tetmajer^{||} has worked with "aluminium-bronze" containing iron and silicon, but what appears to be the most complete account of the copper-aluminium-iron alloys is by Corce and Comstock.[¶]

They have studied the properties of the possible combinations containing 1 per cent to 4 per cent iron and 7 per cent to 10 per cent aluminium inclusive. Their conclusions are that "for the same aluminium content there is always an increase of proportional limit, yield point, and ultimate tensile strength with increasing iron content, and in general a rather less substantial decrease in elongation and reduction of area. In the same way, with constant iron content, the proportional limit, yield point, and ultimate tensile strength increase with increasing aluminium, while the elongation and reduction of area decrease. Also, that for a given strength, better ductility can be obtained with a lower aluminium and high iron alloy, than with higher aluminium and lower iron."

It is, of course, difficult to compare the results of different workers on similar alloys, owing to lack of uniformity in methods of preparation and testing, but a comparison of the results contained in the Eighth and Ninth Reports to the Alloys Research Committee, and those obtained by Corce and Comstock, leads to the following conclusions:

1. Iron and manganese, when added respectively to copper-aluminium alloys (containing 7 per cent to 10 per cent aluminium), have a similar effect, *i. e.*, the yield point and ultimate tensile strength are raised at the expense of the ductility.

2. In the case of sand-cast bars, the addition of iron appears to give better all-round mechanical properties than the addition of an equal amount of manganese. The data are not available for a complete comparison of the chill cast bars, but some promising results have been obtained by the authors with alloys containing 7 per cent to 10 per cent aluminium and 1 per cent to 4 per cent iron. The authors are producing die-castings commercially in one of these alloys, and the following are the average results recently obtained from 24 test bars, cast in 1-inch chill and cooled in air.

It should be pointed out that each bar represents a batch of castings, produced consecutively during a period of several months, under ordinary foundry conditions.

Diameter of test- section	Yield- point	Ultimate tensile strength	Elongation on 2 in. per cent	Reduction of area per cent
in.	tons per sq. in.	tons per sq. in.		
= 0.564	14.7	35.5	24	21.8

These results compare favorably with those for the chill cast bars containing 7 per cent to 10 per cent aluminium given in the Eighth Report, and for those containing 8 per cent to 10 per cent aluminium and 1 per cent to 5 per cent manganese given in the Ninth Report. In several cases the latter alloys give better results, but whether they may be die-cast or not is open to question.

^{||} *Mitteilungen der Material-prüfungsanstalt*, IX Heft.

[¶] Transactions of the American Institute of Metals, September, 1916.

Heat Treatment.—The mechanical properties of the copper aluminium-iron alloys may be profoundly modified by heat treatment, and this probably accounts for the variable results obtained with the same metal under ordinary casting conditions. Consequently, accurate pyrometric control of the die-casting process is advisable, if consistent results are required. The temperature of the molten metal should be known, and that of the die itself, also the rate of cooling of the hot casting should be standardized. Much different mechanical properties would result if instead of quenching the casting red hot from the chill, in cold water, it were allowed to cool slowly in air.

An advantage of the alloy used by the authors is that it is sufficiently fluid to fill the die and give satisfactory castings through a wide range of temperature.

Material for Dies.—The authors have experimented with several materials, ferrous and non-ferrous, for die-making, but have had the best results with a close-grained cast-iron, as hard as is consistent with good machining properties. The block of iron from which the die is made is itself chill cast, to give these qualities. Sometimes the dies have been cast almost to shape before machining, but the results have not been very satisfactory.

It need not be pointed out that a die when once made is only suitable for one particular alloy. Each alloy has its own requirements regarding gating, venting, and shrinkage, and the particular problems of each new part render it very difficult to make a correctly designed die at the first attempt. In an iron die as described above, there can be made from 5000 to 7000 castings similar to the "Butterfly" type of carbon brush-holder (marked No. 1) that is shown, along with other examples of die-casting, on this page, before it shows signs of deterioration. No facing or special treatment of the die surface is necessary, nor is the die cooled down every few minutes; but the plugs, which are of steel, are dipped in a graphite wash between each cast to preserve their shape; even then they do not last so long as the die. The other illustrations represent chiefly different types of carbon brush-holder, all of which are being die-cast on a commercial scale. The design of the die is a most important factor, and here it is where experience is the best guide. The design of the part itself should conform to the special requirements of die-casting, and there is need for the closest co-operation between the engineer, metallurgist and foundry foreman. The number and shape of the part of the die, method, and order of withdrawing the cores, venting, situation, shape and size of the gate, all must be carefully considered in designing a new die.

Cost of Process.—No general rule can be laid down with regard to costs. In some cases die-casting is cheaper, in other cases dearer than sand-casting. The cost of dies, material, labor and machining must be gone into before a decision can be come to as to which is the more economical process. The cost of machining and assembling of the "Butterfly" type of brush-holder above referred to is eight times as great when sand-cast as it is when die-cast, and the other parts shown are also cheaper die-cast. The castings are not sold by weight, as the cost of labor varies both in making the dies and castings. The die cost is treated as a separate item from that of the castings, and is generally borne directly by the customers.

Die-Casting on a Scientific Basis.—For a scientific investigation into die-casting, the following might be carefully studied:

The alloy:

- (1) Coefficient of expansion at different temperatures.
- (2) Specific heat.
- (3) Thermal conductivity.
- (4) Mechanical properties at high temperatures.
- (5) Mass, volume and surface area of casting.
- (6) Latent heat of fusion.
- (7) Metallography.
- (8) Pressure on metal in die.

The die material:

- (1) to (5) As above.
- (6) Possible attack by molten alloy.

Casting conditions:

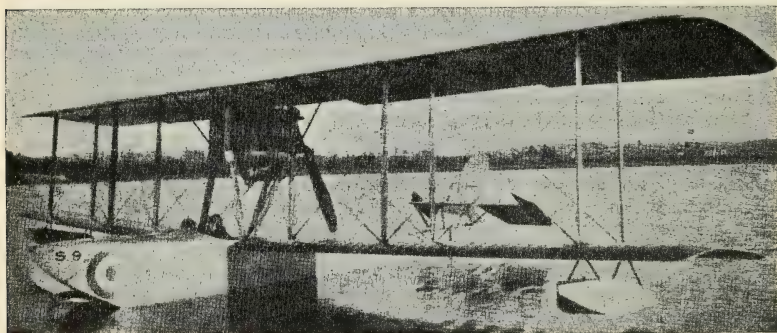
- (1) Temperature of molten metal.
- (2) Temperature of die.
- (3) Length of time in die.
- (4) Rate and method of cooling of casting.

Even with all the above information, however, it would still be necessary, in the case of a new part, to go on more or less empiric lines before a satisfactory casting could be produced.

It might be feasible to design a standard die which would serve as a basis for comparison of results obtained by different observers.

Conclusion.—One of the authors previously quoted summarizes the position by saying that "the principal secret of die-casting is experience, which is the result of tireless effort, skill, patience and—capital."

The thanks of the authors are due to the British Westinghouse Electric and Manufacturing Company, Limited, for permission to publish the above paper and the accompanying photographs.—*Engineering*, 22/3.



No. 1.—The *Savoia* 168 H. P. Reconnaissance Flying Boat. (Italian Official Photo.) (*Aerial Age Weekly*, 15/4.)

LIBERTY MOTOR IN U. S. SEAPLANES.—Secretary Daniels on March 20 issued the following statement: "A navy flying boat equipped with a liberty engine flew from the naval air station, Hampton Roads, Va., to Washington yesterday morning in two hours. The distance covered was about 180 miles. The motor and plane functioned as expected and the aviators report that the engine ran without a miss. Three naval aviators made the trip in the plane, Lieut. D. H. McCulloch, Ensign Slater and Ensign G. M. Brush. Seaplane hangars have been erected on the eastern branch of the Potomac at Anacostia, and similar flights will be made. The navy has several service seaplanes equipped with the liberty engine which are flying daily."—*Army and Navy Journal*, 23/3.

FIRST SEAPLANE WITH LIBERTY MOTORS TRIED OUT.—America's first fighting seaplane, equipped with liberty motors, has been tried out and accepted, and a number of the craft are now being delivered for the use of the naval air service. They are the advance guard of a big fleet which will be added to the forces engaged in submarine hunting in the war zone.

A second type of fighting plane for the American Army known as the Bristol model has now reached the production stage and a considerable number will be available during the present month.

Still another type, a two-seated machine, is being manufactured.

Construction details of these planes never have been published. It is known, however, that the seaplanes are substantially similar to the British flying boats and are equipped with two liberty motors, which provide approximately 700-horsepower. This is understood to be much in excess of the power used in similar British craft and their performance is expected to be proportionately better.

In this connection it was learned that engineers of the aircraft board now have overcome the last minor defect of the liberty motors, having to do with the lubrication system.—*Naval Monthly*, April.

ASKS \$188,000,000 FOR NAVAL AVIATION FOR 1918.—An appropriation of \$188,000,000—double that originally proposed—was asked of Congress by Secretary Daniels for naval aviation during the next fiscal year. Recent war developments, the Secretary said, made necessary the larger sum.—*N. Y. Herald*, 19/3.

THE LIBERTY MOTOR.—Several official statements have been made to the effect that the liberty motor is in production. In fact, it has been stated that the various companies now engaged in its production, such as the Packard Company, the Lincoln Motors Company, etc., have or soon will reach a daily production of 250 engines a day.

The aeroplanes shipped to France have been equipped with the liberty motor. Likewise, in the early part of March, the first fighting seaplanes built in America have been accepted for service. These seaplanes, which are said to be substantially similar in construction to the British flying boats, are each equipped with two liberty motors giving a useful output of about 700-horsepower.

In the final tests and refinements of the motor the aircraft board was assisted by a supervising committee consisting of D. McCall White, Mem. Am. Soc. M. E., and Henry M. Crane, Mem. Am. Soc. M. E.

A bit of light has been thrown on the history of the liberty motor by Emden S. Hare, president of the Packard Motor Company of New York, in an address at the dinner of the Sphinx Club in New York. According to this statement the liberty motor was the outcome of three years' work on the part of the Packard engineers. The company offered this engine to the government. At the time, the aircraft board felt that it would be best in the furtherance of their war plans not to put this motor out under the name of the Packard Company, and the company patriotically sacrificed its private interests in the motor and consented to let its work be merged under the name of liberty motor.—*Journal Am. Soc. M. E.*, 18/4.

GERMAN AERIAL TRAPS.—Some details are given by the frontier correspondent of the *Telegraaf* of a new method adopted for catching hostile airmen which the Germans are employing at Zeebrugge. Towards evening, it is said, they send up 20 captive balloons, without crews, and attached to electrified steel cables. The electric barrier thus created is claimed to constitute a great danger to all airmen coming into contact with it.

PARACHUTE LIGHTS TO BETRAY AIR RAIDERS.—One of the German pilots who participated in the recent air raid on Paris, in an account in the Berlin *Lokal-Anzeiger* of his experiences during this trip says: "Suddenly the French put 'lanterns' in our way. Above and beneath us, ahead and astern, they hung quietly in the air and with their blinding glare lighted up our planes. They are rockets with parachutes provided with their brightly burning fuses. Some special mechanism enables them to remain steadily for a full minute in the air. Sometimes dozens together appeared near us to show our machines to the anti-aircraft guns."—*Scientific American*, 6/4.

NEW TYPE OF GERMAN AIRPLANE.—The Germans, it is stated, have manufactured a new and improved type of airplane. It is fitted with three propellers, one being so arranged that it can keep the airplane stationary above a certain point for a few minutes, thus permitting the bomb thrower to aim with greater accuracy.—*Army and Navy Journal*, 6/4.

PERSHING RECOMMENDS SIX-GUN PLANE.—More powerful armament has recently been proposed for fighting airplanes. In response to an inquiry, General Pershing has recommended at least two heavy and two light machine guns, adding:

"We should anticipate the use of three Vickers synchronized guns and three Lewis unsynchronized guns on every airplane."—*Aviation*, 15/3.



A CURTISS BIPLANE DIVING DOWN AFTER A LOOP, OVER NEW-PORT NEWS. PHOTOGRAPHED FROM ANOTHER AEROPLANE.

UNDERGROUND AEROPLANE SHELTERS.—The recent report in the papers (says a writer in *Motor Cycling*) that the Germans have now constructed underground aeroplane shelters at their much-bombed aerodromes in Belgium seems quite probable in view of the extraordinary ramifications that underground warfare has reached. Whether it is true that the machines and pilots taxi up inclined ways from these underground shelters is another matter. These caverns must be of enormous area, especially if they are used to accommodate one giant bombing machine of 80 feet or 100 feet span. Even if these machines were made to fold up for the purpose of ease of storage, they would take up a great deal of room, for you cannot even store a medium-sized aeroplane in the space occupied by a motor bus, which is so much more compact in size.—*United Service Gazette*, 28/2.

U. S. AIRPLANE MARKINGS.—The Signal Corps authorizes the following:

All airplanes manufactured in the United States for the army and navy will bear a red, white, and blue bull's-eye of three concentric circles, similar to the insignia of allied planes, on the wings, and vertical red, white, and blue stripes on the rudders.

The specifications follow:

Wings: Red circle with diameter approximately equal to chord (of wing), one blue circle with diameter two-thirds of chord, center white circle with diameter one-third of chord.

Rudder: Vertical red, white, and blue stripes, starting at rudderpost.

The above markings were adopted by the joint army and navy technical aircraft board on January 11, and approved by the Secretary of War and the Secretary of the Navy.—*Official Bulletin*, 4/3.

BIG ZEPPELIN PLANT DESTROYED BY FIRE.—The Zeppelin factories at Mamselle, near Friedrichshafen, were destroyed by fire Saturday night, it was learned here to-day.—*Baltimore Evening Sun*, 15/4.

HUGE HUN AIR FLEET DESTROYED BY FIRE.—The material losses in the fire which destroyed the aircraft factories at Friedrichshafen were enormous, including 30 squadrons of airplanes reserved for use against the American air fleet, it was announced here to-day.

One hundred and forty persons were killed and 200 injured.—*Baltimore Evening Sun*, 16/4.

LIBERTY MOTOR USE LIMITED.—Concerning the liberty motor, the committee (Congressional) said:

"It is not designed for and cannot be used in the swift single-seater fighting machine. A few of the motors are being flown in appropriate machines. The reports, as recited to the committee, indicate that with the latest changes the motor will be satisfactory for the character of work expected of it, and that it bids fair to hold its own with foreign motors of similar power, weight and purpose. For the campaign of 1919, the liberty motor must undoubtedly be further improved to keep up with the evolution constantly going on along the front.

"A total of 2500 liberty motors have been ordered, 122 have been completed for the army and 142 for the navy. Four have been shipped overseas. Some of those already delivered are being altered to overcome the defects ascertained during the last few weeks.

"The production of liberty motors to date is, of course, gravely disappointing. The testimony shows that experts of the highest reputation and experience have since last July repeatedly warned the officials of our government that the perfecting of a newly designed motor must inevitably involve many months of painstaking experiment, accompanied by many setbacks and disappointments. In spite of the unanimous testimony of motor experts along this line the government officials having the manufacture of the liberty motor in charge have made the mistake of leading the public and the allied nations to the belief that many thousands of these motors would be completed in the spring of 1918."

The production of combat planes is declared thus far to have been a substantial failure and to constitute a most serious disappointment in war preparations.—*Baltimore Evening Sun*, 10/4.

SAY LACK OF OXYGEN CAUSES AIR WRECKS.—They stood in a compact, little group on the wide sweep of level ground that marked the training ground of an aviation field. Three were United States Army officers. They wore on their left breasts the silver wings that showed they were expert birdmen, who had learned to emulate the swallow's flight in machines of man's invention.

The group was watching the tiny dragon-fly that was skimming far above. Admiration showed on each countenance as the fragile thing climbed to a dizzy height, dipped and dived toward earth with lightning-like speed, and then straightened out.

Now the droning of the motor has stopped as the pilot has shut off the engine and begins to volplane from a great height. Faster and faster dashes the frail thing toward earth at terrifying speed. He must straighten out soon or meet disaster. Breathlessly the little group watches, listens for the hum of the motor that will tell that the headlong flight has ended and the pilot has straightened out to safety, but the machine continues on its perilous course.

Too late. He's too near the ground now to straighten out. They can see the driver working dully to make a safe landing. Some stand breathless, awe-stricken. Others turn from the sickening sight.

Crash!

With a sound of splintering wood the biplane hits the ground with terrific impact, and smoke begins curling up from the mass of splintered wreckage. Spurred to the necessity of immediate action, the men race to the scene, a bare 200 yards away, and begin to work frantically to release the poor lad buried beneath that tangled mass of wood, canvas and wire.

"There he is," cries one of the officers.

Lying amid the wreckage, his face and head gashed by splinters of wood, the pilot lies with eyes closed, face white and drawn. Tenderly they lift him out and place him in the ambulance.

"He'll live if nothing inside is injured," said the officer who wore the insignia of the Medical Corps.

"High altitude probably caused reduced pressure and made him lose control," mused one of the officers.

"That must have been it," affirmed another, "for the motor was O. K. when he volplaned time before last, and his controls seem to be all right. Guess he couldn't stand the pressure. It's funny what high altitudes do to some people."

In many lands, on many fields, the same accidents were chronicled for the first three years of the European war. Always either mechanical defects or reduced pressure from high altitudes was blamed.

Finally it occurred to members of the Army Medical Corps attached to aviation sections that perhaps there was some other cause that made apparently sound men lost control of their airplanes. Tests were made.

Aviators were being maimed and killed through loss of control because of the diminished percentage of oxygen at higher altitudes. They remembered the difficulty in breathing related by mountain climbers, aeronauts and others who reached the rarer atmosphere of unusual heights.

With the entry of the United States into the struggle, army medical officers at once took up the problem. Tests were conducted at various flying fields.

It was found individual flyers began to suffer from the lack of oxygen at varying heights, but that the same individual began "breaking up" at the same altitude day after day.

Perhaps one of the greatest difficulties encountered was the fact that the flyers did not realize that they were being affected by the lack of oxygen as the height increased. Even after they crashed to earth they had no idea why it had happened, for "everything had been working all right when she started the nose dive." That is what those who survived said.

What really happened? Just this:

The lungs require 21 per cent of oxygen or 65 millimetres of oxygen when a person is on the ground. As the birdman climbs swiftly to greater heights, the air contains less oxygen and the pilot finds it increasingly harder to keep that amount in his lungs. It requires faster breathing. This increases commensurately the higher he climbs.

Inversely as the machine descends swiftly from a higher altitude to a lower, he gets more oxygen with less effort. In either event, he begins to lose efficiency. Co-ordination between hand and brain decreases. He is

slower to respond to what his brain telegraphs him to do and less accurate in doing it. He fumbles at the controls.

Sight becomes less keen, especially at a short focus. His attention on the aeroid, which shows his height, is not so constant, his hearing is affected so that he cannot distinguish by the sound of his motor whether it has accelerated or slowed. Finally he faints—and the machine plunges to earth.

It has been recommended that all aviators be tested and classified as to ability to stand lack of oxygen. Those who cannot go to greater heights because of its effect on their efficiency, will be kept in bombing and observation machines, which fly at comparatively low altitudes.

Those who can go to great heights without being affected, will be chosen for the fast battle and scout planes, which must fly in squadron formation, which, like a chain, is only as strong as its weakest link—in this case the aviator who will first succumb to want of oxygen.

Naturally a remedy for this condition has also been suggested. It is to have each airplane carry a tank of oxygen, which will be coupled to the aeroid, or height indicator. As the average aviator begins to "break up," or become less efficient, at 13,000 feet, at this point the indicator of the aeroid will automatically open a valve connected with the oxygen tank, and the aviator, breathing through a mouthpiece, will be supplied with the normal amount. As the height increases, as indicated by the aeroid indicator, the valve will be opened wider and a correspondingly greater amount of oxygen will be administered.—*Baltimore Evening Sun*, 9/4.

AIRCRAFT PROGRAM SCORED AND PRAISED.—Difficulties encountered in developing the nation's great aviation program were presented to the Senate in widely different aspects through majority and minority reports on the military committee's protracted investigation of the subject.

The majority, through Senator Chamberlain, of Oregon, chairman, declared the entire aviation situation gravely disappointing, charged government officials responsible for the program with misleading the public with over-optimistic statements, and urgently recommended that control be taken from the Army Signal Corps and placed in the hands of a single executive officer appointed by the President. This report is understood to have been adopted by a vote of eight to six in the committee.

Senator Myers, of Montana, and Kirby, of Arkansas, joined Senator Shepard, of Texas, in the minority report, which asserted the majority failed to give an accurate impression of the facts, and that in the face of unparalleled obstacles "on the whole the record of the Signal Corps is one of which every American can be justly proud."

Although the majority says the production of combat planes has been a substantial failure, apparently there is no great difference of opinion between the majority and minority as to the present status of the program as a whole, the disagreement arising over whether there has been inefficiency and procrastination and misleading publicity, as the majority charges.

Some information heretofore regarded as closely guarded secrets is disclosed in the reports. Among other things it is shown that:

Primary training planes to the number of 3458 and 342 advanced training machines have been completed in this country.

Production of training planes in the United States is now proceeding on quantity basis.

Arrangements have been made with France for the construction there of 6000 battle planes by 7000 American mechanics sent across the ocean for the purpose and using 11,000 tons of American material;

Construction of 11,500 battle planes in the United States is planned;

Twenty training schools in America have graduated 1926 reserve officer aviators, although few of them have been given advanced training, and that

Of 1200 cadets sent last year to England, France and Italy for training only 450 have completed primary training, and because of the lack of planes the others may have to be recalled home.

The liberty motor, the majority report declared, is "just emerging from the development or experimental stage" and "is not designed for and cannot be used in the swift, single-seated fighting machines." Of 22,500 liberty motors ordered, the committee said, only 122 have been completed for the army, 142 for the navy, and four shipped overseas.

"The production of liberty motors to date is, of course, gravely disappointing," says the report. "Government officials . . . have made the mistake of leading the public and the allied nations to the belief that many thousands of these motors would be completed in the spring of 1918. Information of this sort, not borne out by the facts, has been injurious, and its constant dissemination the committee regards as misleading and detrimental to our cause."

Regarding the training of aviators the committee found there had been "very serious delay" in providing them with training planes.

"As a result," the report says, "several hundred of the American cadets have been practically idle and have made no progress."

The minority report citing the arrangement with France for producing battle planes, said:

"As American aero squadrons reach the front ready for duty battle planes have been supplied them under this arrangement."

In producing combat planes at home—defining the term to include both offensive and defensive machines—the minority said about 25 plants are engaged, either on complete machines or parts.

Referring to difficulties of airplane production the minority declared:

"When war began the United States Government had purchased altogether less than 200 airplanes in its entire history, and probably not one factory was making over five or six a month. It is hardly possible to grasp the magnitude of the task the factories contracting 11,500 combat planes found before them." New plants had to be erected, the report said, new tools fashioned for delicate and complicated machines requiring 4000 parts and 2800 drawings—almost as many as for a battleship.

Investigation of aviation problems by President Wilson's special committee, headed by H. Snowden Marshall, still is in progress and a preliminary report from that body as to its findings in connection with organization of the aviation service has been called for by the War Department. It has been indicated at the department that action toward readjusting for the production of aircraft probably would be based on that report.

The publication of specific figures in the Senate Committee's report attracted considerable attention among army officers. Brigadier-General McIntyre, chief military censor, said he had not been consulted as to the advisability of making the disclosures.

There is a growing feeling about the War Department that a final settlement of the air program controversy must be reported very soon unless the efficiency of the personnel now in charge is to be impaired by the unrest and confusion created by constant agitation. Officers pointed, however, to the fact that the majority report itself shows better production figures are now coming forward as the program gets under way after much difficulty from whatever cause.

The Marshall committee's preliminary report is expected within a day or two. It has been intimated that a decision as to steps to be taken will be reached soon afterward.

The subject was brought up in the House to-day by Representative Caldwell, of New York, chairman of the military subcommittee on aviation, who defended the Signal Corps and declared the manufacturers of the United States have thought more of their country than they have of European money "and to-day we are manufacturing upward of 1000 airplanes every month and the production is increasing every day." He said that any unfulfilled promises regarding the program had not been made by army officers.—*Baltimore Sun*, 11/4.

MISCELLANEOUS NOTES

GERMAN TRAPS AND RUSES.—The Military Intelligence Section of the General Staff of the United States Army has compiled some valuable data on ruses and snares devised by the Germans, and used when retreating, and has also given the precautions to be observed to avoid them. We make the following extracts from the information furnished by the General Staff, which will be of interest to officers and men destined for service abroad.

Precautionary Measures.—As it takes some time to prepare these traps some of which, as at Roye and at Noyon, were laid in the fall of 1916, one must expect to find traps more especially in those localities where the enemy has voluntarily retreated, rather than in the places from which he was dislodged by an attack or rapid advance.

Until specialists have had a chance to investigate one must be very suspicious of the following: Shelters which are excessively well furnished or luxurious; shelters dug under roads or near paths; houses that seem miraculously to be left standing among ruins; all new works, recently constructed trenches; parts of equipment still in good condition left with others which have been worn; freshly turned soil; metal scraps; wood work of shelters and framework of galleries which do not look decayed; the favorite "souvenirs" of soldiers, such as rifles, bayonets, empty cartridge shells, projectiles, shields, helmets, left clearly in evidence as though purposely on the spot where found; frames moved from their regular places; articles stuck in the ground or walls, arms, shovels, grenades; suspicious objects, utensils scattered around trenches, shelters or saps; even the flooring of the firing steps which look lately repaired; new ballasting and refinished floors.

Even entrances to shelters which have been destroyed by an explosion, are not wholly safe, for mines may be concealed in the undamaged parts, behind the wreckage or in other intact entrances.

Stabling for horses should be thoroughly disinfected and only used cautiously after burning all the bedding, straw and oats left behind.

The following sign—"Use of this water is forbidden"—must be placed above all sources of water supply, until it has been analyzed by technical experts who guarantee it perfectly harmless. The expert designated will later state whether the water is "drinkable" or "dangerous."

The men charged with clearing out wells which have fallen in must be carefully equipped with safety ropes and gas masks so as to escape deleterious gas which might remain from the explosion and to climb out quickly in case of danger.

Listening tests will be made in buildings, galleries and subterranean chambers to make sure that there are no clock-work driven infernal machines.

Roads should be made the subject of painstaking inspection in order to detect mine galleries or fougasses prepared in view of their destruction.

Certain other precautions for testing springs and for the preliminary examination of suspected places are also considered effective.

Methods Used for Firing.—The traps work automatically or electrically, sometimes with a clock-work fuse or through a "silent" mechanism with a spring attachment which silently and slowly extends.

The mechanism may be released by walking over or leaning against an object; a board presses on a safety pin, which releases the spring of an igniter or primer firing pin causing it to strike a detonator.

The electrical arrangement is operated by pulling on a wire or by making contact walking over an object.

The "silent" mechanism is an automatic detonator containing an acid which releases a spring by eating through it.

One should therefore cut all suspicious looking threads, being careful not to sever those stretched tightly or taut ropes, which may be found among

slack telephone wires, for they may support weights which, once released, fall and strike detonators.

When cutting wires, one must take pains not to pull them, but simply separate the two ends which should be marked, when numerous, with the same sign, so as to permit the technicians to identify them when they search for explosive charges, which must be removed to avoid accidents.

Any observations or discoveries which may be made along these lines should immediately be reported to the general commanding the army (second bureau).

New Devices.—According to information from prisoners it appears that the Germans, in addition to the traps and ambushes above mentioned, have made preparations on a large scale for mining the trenches and shelters which they contemplate evacuating. The mines will explode when we have occupied the trenches and shelters.

Therefore, it is necessary, during the advance, to forbid the use of enemy trenches and shelters until it has been ascertained that they are not dangerous and hide no trap.

The first lines especially must not occupy enemy trenches, but should go beyond and build new trenches, in order to avoid all danger from explosions of mines laid by the enemy.—*Army and Navy Journal*, 23/3.

U. S. AND CANADA SETTLE FISHERIES DISPUTE.—Ottawa, March 12.—It is officially announced that the fisheries dispute between Canada and the United States has been settled at least for the duration of the war.—*Reuter*.

The dispute, which is more than a century old, centered round the necessity which Canadian fishing vessels from the fishing banks were under of putting into a Canadian port in order to change their status from a fishing to a cargo-carrying one before entering an American port. In order to increase the food supply, it has now been agreed that the fishing vessels may enter and clear between American ports and the fishing banks directly.

USE OF WAR CAPTIVES IN U. S. CONSIDERED.—The State Department officials have begun serious consideration of the question of dealing with German prisoners who may be taken by the American Army in France. For the present there is plenty of work for them to do in France in preparing the American bases for the reception of troops now going abroad, and in railroad work and trench work behind the lines.

In all probability a goodly proportion of them will be employed in this work at all times, but it is still possible that a surplus will be available. At the present time the officials are carefully examining the subject with a view to bringing prisoners to this country to be employed in agricultural and other work suitable for military prisoners.

The investigation now going on also includes the question of the employment of alien residents in the United States who are officially registered as such.

There are all kinds and degrees of enemies among the registrants, including many who will become American citizens as soon as they can, and some of whom prefer allegiance to the United States at this time. Special permits have already been given many of the loyal men, and they are now at work.

Under international law those who decline to work for the government cannot be forced to do so, but their attitude may be tested by inviting them to do something helpful. Just what method of approach will be employed will be determined by the investigation.—*Baltimore Sun*, 12/4.

BRITISH LJUNGSTROM TURBINE INSTALLATION.—The first British Ljungstrom marine turbine installation has just been completed by the Brush Electrical Manufacturing Co., Loughborough, to the order of the British Ljungstrom Marine Turbine Co., Ltd. It is intended for a steamer building

for Chambers and Co., Liverpool, by Blumer and Co., Ltd., Sunderland. The vessel is of 6000 tons d. w., and the machinery consists of a Ljungstrom turbo-electric installation of 1750 equivalent indicated horsepower, capable of driving the vessel at 10 knots. There are two turbo-generators, each unit consisting of a Ljungstrom turbine with generator at each end, rotating in opposite directions at 3600 r. p. m., and generating 312 kw. three-phase alternating current at 650 volts, with a periodicity of 60 cycles per second. Each generator is mounted directly over the condenser, the condensing plant being on the contraflow kinetic system. Current from the generators is led to two synchronous motors running at about 720 r. p. m., with a slip of 0.8 and each of these drives the pinion of a double helical reduction gear, to the gear wheel of which is connected the propeller shaft, which rotates at about 75 r. p. m. The total electrical power of the installation is 4×312 kw., i. e., 1248 kw., which is equivalent to a horsepower of about 1750. All the bearings of the generators, motors and gear, as well as the gearing itself, are lubricated under a pressure of about 10 pounds per square inch, and the air drawn through the cooling ducts of the high speed generators, at a temperature of about 100 degrees fahrenheit, is led direct to the furnaces, the partially-warmed air entering the pre-heaters fitted in the smoke-box in the usual way. All the auxiliaries are driven by electric motors, so that the whole of the machinery on the ship will be on the rotary principle. It is estimated that the steam consumption for all propelling purposes will work out at about 10 pounds per shaft horsepower, which is equivalent to a coal consumption of 1.07 pounds per shaft horsepower.—*Shipping*, 16/3.

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SCIENTIFIC AMERICAN. **April.**—How Wireless Helps the Marines, by *Lieutenant R. A. Lavender*, U. S. N. Guns of the *Queen Elizabeth*. Unsinkable Ships, by *C. V. A. Eley*.

GREAT BRITAIN

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CONTEMPORARY REVIEW. **March.**—Is Peace in Sight? by *Diplomatist Holland* and the War, by *Dr. P. Geyle*.

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NAVAL WAR NOTES

PREPARED BY

LIEUTENANT G. B. KEESTER, U. S. Navy

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STRATEGY

BIG SEA DRIVE URGED AT WASHINGTON NOW.—Pressure for a naval offensive to supplement the costly battling on the west line is manifest anew in army and navy quarters. And there are those among the navy officials who predicted to-day that more aggressive sea action will come before July 1, though they did not venture to predict its magnitude.

Such as entertained this view pointed out that America has supplemented the British Navy with battleships, submarines, destroyers and, in fact, all types of naval craft. This, to their minds, was significant of a plan for more aggressive steps than simply warding off the submarines after they get out of their German nests.

While the advocates of an allied offensive are active, there are some indications too that the German Navy may take the first action in line with the policy of gambling everything on a victory this year. In some respects such an offensive might result more advantageously to the Allies than should the latter themselves attempt the aggressive, it was suggested.

One official, whose insight into naval affairs is recognized as especially keen, expressed the view that the allied navies would attempt a stroke at Zeebrugge, Wilhelmshaven or perhaps the Teuton stronghold, Helgoland.

"England," he declared "cannot afford to make a big gamble, however. She has kept the seas clear with her navy, and it is true that were it not for her powerful naval forces the German would now be on the seas. In such circumstances you can see that she cannot risk her vessels. But I do believe you can look for some action before July 1."

Acting Secretary of the Navy Roosevelt is known to be one of those who believes an aggressive rather than a defensive policy on the seas is desirable. He has the support of the younger set of navy officers, while a number of progressive army men say, too, that such a policy is needed now in the light of west-front developments.

Against this view is that of older navy men, who think that the chance is too great to take.

Yet the sending of big battle units indicates to many that a move other than merely protecting traffic against the U-boats is under contemplation, and it is deemed quite possible that at least a testing out of the German bases will be attempted.

Meantime, Germany is apparently trying to augment her own naval strength by getting Russian craft. All of the latter are powerful.—*Baltimore Evening Sun*, 10/4.

GREATEST ACTIVITY REIGNS AT GERMAN NAVAL BASES; GREAT RAID IS PREDICTED.—Geneva.—The greatest activity reigns at German naval bases, especially at Kiel. Coal and ammunition are being shipped to the fleet in large quantities, according to information received here this morning from a reliable neutral source.

German naval contingents, with heavy guns, were recalled recently from the western front to join the fleets and were replaced by Austrian artillery manned by land forces.

Indications are that a naval raid of great magnitude is about to be attempted.—*N. Y. Herald*, 13/4.

FUTURE DREADNOUGHTS.—Nothing has so far been accomplished to disturb the faith of the allied sea powers in the big gun and the big ship as the controlling instrumentalities of sea war. Despite the successes of a submarine warfare controlled by pirates who violate all the international agreements they had entered into and defy the laws of God and man, the civilized maritime nations still hold that if naval armaments are to be perpetuated the great armored vessels will maintain their predominance. It is safe to claim, then, that if the allied navies, three of which have had nearly four years' war experience, continue to build super-dreadnoughts the submarine has failed to prove its case.

Although her naval policy has not been indicated, something of Great Britain's intentions and her continuing practice must be known to the American officers in daily communication with the Admiralty, and if any radical change was imminent our policy would in some degree be governed by the information sent us. It is of official record, however, that instead of altering in any way our program of 1916 the Navy Department has recommended the completion of the battleships and battle-cruisers carried by it. It is known also that during the war Japan has confined her naval construction principally to "capital ships," and it is declared in Tokio that a new program to be introduced in 1921 will call for the building of 48 battle types, to be grouped in three squadrons, each with 16 units.—*New York Herald*, 8/4.

FUTURE OF BIG SHIPS.—There is little doubt that battleships and battle-cruisers are essential at present, yet the developments foreshadowed by Admiral Aube, Mr. Gabriel Charmes and the "Jeune École" in France in the early eighties, as the result of the torpedo and torpedo-boat, are still in progress, and while it is easy to prophesy that future developments in the air and under the water will eventually sound the knell of the heavy fleets, it is very uncertain when it will occur; it would be folly to act upon it now, or that we can safely, as the French naval reformers advocated, scrap our big ships and devote ourselves to small fast vessels, submarines, and aeroplanes. I may add, in concluding this attempt at dealing with a very difficult subject, a warning that in naval matters it is seldom that any leap in the dark is immediately successful, and though foresight and prescience are always needed, common sense and experience are the only safe guides. To be wise after the event is the privilege of the writer and critic, myself included, but in condemning former Admiralties for lack of imagination we may remember that Admiral Aube's theories resulted in a suspension of ironclad ship-

building and the weakening for years of the French Navy, and that "the wisdom of our ancestors," so often referred to with little respect, as circumstances have changed, is sometimes found to be again of value under modern conditions. In proof of the above I may refer to two things: first, the successful reintroduction of the convoy system, which was supposed to be incompatible with modern trade requirements; and secondly, the value of the experience and seamanship of the sailor, untrained save in the exercise of his seamanlike qualities in navigating small vessels and fishing-boats, and his knowledge of the secrets of the sea.—*Admiral, United Service Magazine*, 18/3.

A REVIVED CAMPAIGN.—For a good many months past German attention has been so entirely concentrated upon the promised effects of submarine warfare as an instrument of "peace" that the real naval aims and ambitions of Germany have seldom been mentioned in the press. Now the naval propagandists are apparently trying to make the public regard the submarine warfare, not as a thing apart, but as one department of general naval warfare, and to revive public enthusiasm about the overthrow of British naval supremacy as one of the essential objects of the war.

The German Navy League, in spite of Count Hertling's speeches, is steadily insisting upon the importance of the coast of Flanders as the base for German operations against England in the next war. A new navy league circular says:

"It is along the coast of Flanders that the road passes to London, the heart of England and the only English port on the east coast which has hitherto hardly lost any of its importance because it cannot be put out of competition owing to its splendid docks and the density of the population. But the whole sea traffic through the Channel to the Thames is exposed to flank attack by our submarines on the coast of Flanders. It would not be impossible to send submarines from the German coast to the Channel, although they would have to overcome considerable difficulties. But it would be pretty hopeless to make a raid with destroyers, if our destroyers had to cover the whole course from the mouth of the Ems along the Dutch coast; they would be deprived of the possibility of effecting a surprise, and the prospect of success would be greatly diminished."

The navy league also explains that possession of the coast of Flanders is essential for future air raids on England. It says:

"It is obvious that our aircraft cannot do without the coast of Flanders for their attacks on England and also for their reconnaissances. Possession of the coast means an extension of the effective range of both our military and our air forces; our naval air forces simply cannot do without it."

In the *Vossische Zeitung* Captain Tägert, a well-known naval officer, sets out the new argument of the Naval Press Bureau—that unrestricted submarine warfare was begun because it was the only possible means of undermining British sea power. He justifies the false promises which were made by the German naval authorities a year ago by the simple assertion that, as unrestricted submarine warfare was a naval necessity, all excessive optimism which served to remove objections was beneficial! He argues at length that no military events on land could or can affect the ability of England to continue the war, and that it was of great importance to Germany to establish the unrestricted use of submarines, not only for the purposes of the present war, but also "in order to parry in the future any threat by England of a blockade."

Captain Tägert assumes, of course, that the submarine war will ultimately succeed, but it is very interesting to note his definition of the naval situation—unrestricted submarine war apart. He writes:

"England had closed the gates of the North Sea. From bases dominating all the important sea routes her cruisers swept the seas free of enemy ships. Invisible, secured against sudden invasion, and yet ready at any moment to strike a blow with overwhelming superiority, the English high sea fleets

lay waiting in their ports. Under their protection English sea trade followed the old, profitable roads. . . .

"If England's Allies collapsed militarily and economically, England could continue the war as a pure naval war, with almost the whole tonnage of the world at her disposal. If she succeeded, at the conclusion of peace, in forcing or persuading the Central Powers to limit their naval armaments, England's position of predominance in Europe was secure in the future as in the past. The economic harvest of the war could then be gathered in without interference. That was the situation which forced us to take up the decisive struggle against England's sea power.

"We could not produce a decision by throwing in our high sea forces. Even after a successful battle our fleet, without any bases, could neither blockade England nor keep the ocean open for our sea trade. In spite of numerous individual successes, our submarines found no opportunity for decisive action against our most invisible and most unreachable enemy."

Captain Tägtert further admits that "occasional bombardments of the enemy coast" are ineffective, and that the much advertised excursions of the German raiders are dangerous adventures, which are necessarily of brief duration.

The conclusion of the article is, in effect, that the submarine war has at least proved a powerful contributory cause of a comparatively favorable situation. Captain Tägtert claims as a special result of the submarine war that "the masses of workers in England are getting uneasy and demanding from their government a moderation of its Imperialist war aims." Finally he exclaims:

"How much farther we should be from a decision of the war if the whole road leading to the success of the submarine war—which even now seems to many people to be too long—had still to be covered!"—*London Times*, 20/3.

LESSONS OF THE WAR

ALLIED CONVOY SYSTEM.—In its issue of January 19, the Amsterdam *Algemeen Handelsblad* prints an article, with accompanying diagram, from its Berlin correspondent describing how the Allies are convoying merchant vessels through the war zone. The article, freely translated, reads as follows:

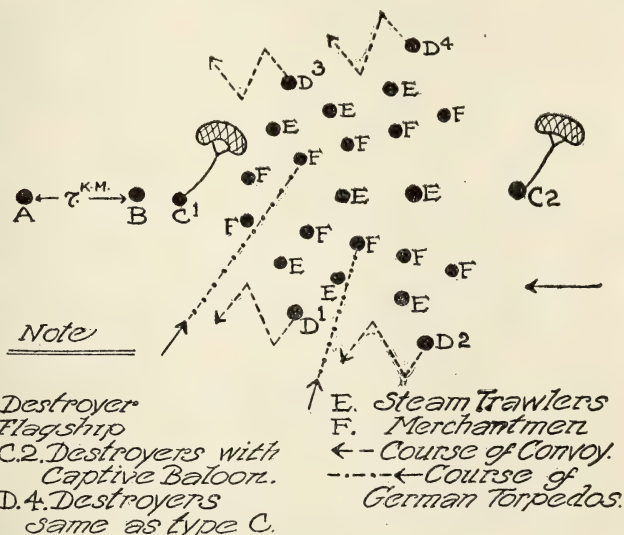
Various methods are in vogue for convoying transports and merchantmen. The order in which the escorting warships sail is determined by the importance, the size, the number, and other determining factors of the vessels convoyed. The plan hereinafter described is not always followed, but shows how the protecting naval units are distributed around a representative convoy of 10 merchantmen sailing between England and Norway.

Ten merchantmen, represented in the accompanying diagram by black dots, are placed *en echelon* midway between line abreast and line ahead formation. In line abreast ships would sail side by side; in line ahead they would sail one directly behind the other. It is plain that a line abreast formation would present an altogether too easy target for enemy torpedoes. On the other hand, a single file formation would be easiest for the captains of the merchant ships, because each commander would only have to follow directly behind the vessel preceding his. In such a case, however, the distance between any two ships must be at least 500 yards, and the length of the convoy would be such that its head and tail might lose sight of one another.

While the *echelon* offers the advantage of shortening the distance, it suffers from this drawback, that a torpedo might, after missing the *echelon* on the left, hit a ship in the right *echelon*. In front of the convoy and at least three or four nautical miles in advance of it, steams a modern destroyer *A*, which is provided with a submarine receiver, and which enables it to detect the sound of the screw of a submarine, inasmuch as the latter

differs in a marked degree from the sound made by the screw of an ordinary steamer.

Behind destroyer *A* follows the commander's ship *B*, which is either a small cruiser of an older type or a so-called submarine destroyer, and which directs the speed, course and formation of the convoy. After the commander's ship comes a torpedo-boat destroyer of an older class *C1*. To it is attached a captive balloon. Observers stationed in this are enabled to overlook the surface of the sea to a wide extent, and are also able to detect submarines to a considerable depth below the surface. At the rear of the convoy is another torpedo-boat destroyer *C2*, with a captive balloon likewise attached to it. The flanks of the convoy are protected by torpedo-boat destroyers of the *C* type, sailing in zigzag formation. Closer protection to the vessels of the convoy is afforded by the steam trawlers *E*. Some of these also steam in the center of the convoy between the two echelons.

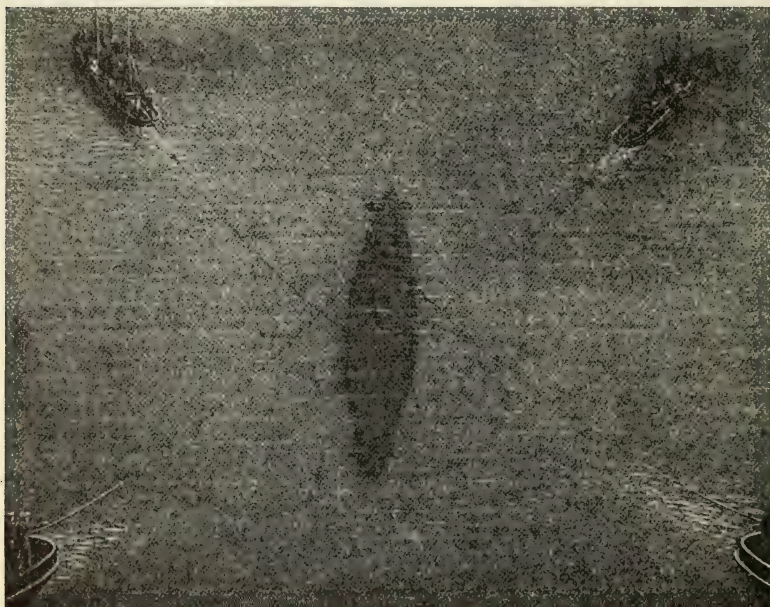


While the procedure above described is not invariably followed, it indicates some of the difficulties at present incurred in bringing vessels safely into port. It also shows how hard it is to shoot one or more vessels out of a convoy without being detected.—*Nautical Gazette*, 21/3.

INGENIOUS WAYS OF DESTROYING U-BOATS.—These are not happy days for the U-boats. Not only is the prey more elusive than in the halcyon days of 1915 and 1916, when merchantmen were unarmed and without convoy, but the U-boats are being actually pursued and destroyed even when seeking the seclusion of the ocean depths. So the U-boat has come to be the pursued just as much as the pursuer; and months hence it may be almost entirely the pursued, if allied efforts are pushed still further; for we are told that the U-boats are now being destroyed as fast as they are constructed. When American destroyers and submarine chasers take to the seas in large numbers, when our building program in this direction is realized, then the doom of the U-boat will be effectively sealed.

Encounters with submarines are always interesting, especially if the censors permit them to be described in full. Recently, for instance, an

American steamer had a brush with a U-boat which resulted in the probable destruction of the latter. It appears that the crew of the steamer saw a torpedo coming toward them, but there was not time enough to stop or alter the course. Fortunately, however, the torpedo missed; and the master of the steamer, with rare presence of mind, ordered the course to be shifted so as to follow the wake of the torpedo. Having gone but a short distance along the foamy path left by the torpedo, the steamer suddenly came up to the U-boat which was then rising to the surface, as depicted in our cover illustration. The submarine tried to avoid the blow, since it was too late to submerge. But the steamer's wheel was shifted, and it crashed full tilt into the U-boat. The badly battered hull of the German raider was seen to sink rapidly after that.



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HOW THE FOUR TRAWLERS SUCCEEDED IN ENMESHING THE MINE-LAYING
SUBMARINE.

A more interesting case is that recently described by a writer in the *Liverpool Journal of Commerce*, as follows:

"A seaplane had 'spotted' a submarine lying on the sea bed. Instantly, the observer's finger commenced to tap a key, and 10 miles away a long, lean destroyer and four squatty trawlers detached themselves from a pack of hounds working a covert and hastened to the kill. Meanwhile the seaplane circled around, but when the surface ships arrived, her instructions, delivered by wireless, were curt and precise. Acting upon them the trawlers stationed themselves at the four corners of a wet quadrangle, while the destroyer kept her guns ready to talk to the enemy should he appear above the surface.

"The trawlers at the corners of the quadrangle got out their sweeps—long wire hawsers of an incredible stoutness, with a heavy 'kite' in the

center to keep their lights down on the sea bed—and commenced to steam toward each other. As the pairs of vessels met, their wires simultaneously engaged themselves under the U-boat's bow and stern, and commenced to work their sinuous way between her hull and the sea bottom.

"Then the strange thing happened. Two round, black objects seemed to detach themselves from her hull and float surfaceward, to hover a second and then to commence bobbing down the tide—bobbing down a lane much frequented by those ships that brought food, munitions of war and hundreds of other things to England's shore.

"'Mine-layer, eh?' called the seaplane's observer.

"'That's it, lad,' came the telephoned answer, 'but her eggs can wait for a minute.'

"The trawlers now crossed their dependent cables and thus held the U-boat in a kind of cat's cradle. She seemed suddenly to wake up to her danger, for with a bound she tried to disengage herself from the meshes which held her. But it was no use; the trawlers had been too long at the game to leave any loopholes and the submarine was doomed.

"'Got him,' signalled the seaplane.

"'Thanks,' replied the destroyer. 'We'll give him five minutes to come up and breathe, but no longer.' That time passed but still the submarine made no further move.

"At a flagged signal from the destroyer the port foremost trawler and the starboard after one clipped a small red tin of high explosive to the bar-taught wire, and allowed it to slide down till it touched the U-boat's hull. It was the seaplane's turn to wave a flag, and immediately there followed the crashing of two fists upon two firing keys; the uprising of two gray mounds of water and a rumbling, muffled explosion.

"The seaplane circled twice above the patch of rising oil, ascertained that the German had been destroyed and notified the destroyer of the fact. Then, with her observer slipping a drum of cartridges into his machine gun, she sped on after those objects bobbing down the tide. A burst of rapid firing, and the first of the devil's eggs, its buoyancy chamber punctured, sank with a gurgle; the second gave a better show, for it exploded grandly and harmlessly as the bullets reached it."—*Scientific American*, 30/3.

SUBMARINES PLAY HIDE AND SEEK.—Hunting submarines in the northern regions seems to be attended with considerably more difficulty and danger than in the lower latitudes, according to an article recently contributed on the work of the British Navy in the Arctic. It says: "Submarines hide themselves among the ice floes and many are the exciting games of hide and seek played in those still waters, with only the seals and grampus for witnesses. Fogs, both in summer and winter, are a very terrible thing in these Arctic waters. The cold wind, blowing on the warmer water, raises an impenetrable mist, and probably causes as many losses as the enemy's best efforts. And the sun, which does not set for months in the summer, gives an unfair advantage to underwater craft. With conning-tower awash and approaching a surface speed of 16 knots, they are very difficult to detect in all but the calmest weather."—*Marine Journal*, 23/3.

ZIGZAGGING AT SEA.—Zigzagging by commanders of vessels to elude attacks by submarines has a protective value which it did not possess before merchant ships were armed. Now that the tramp is apt to carry a rapid-fire gun of from 3 to 6-inch caliber, the U-boat once it has come within the effective range of the gun, must stay below. In the old days a submarine with 14 to 17 knots speed did not hesitate to run down its prey on the surface, and a large proportion of the victims were sunk by gun-fire. But when a merchant ship begins to mount powerful guns, with navy-trained gunners behind them, the sinking, even of slow tramps, became a very difficult and hazardous task.

On sighting an approaching ship the submarine heads to intercept her course, submerges, and then takes an occasional look at her, bringing her periscope above the water for a few seconds only. The U-boat commander estimates the speed and course of the ship, submerges and lays his own course by compass while below so as to bring his boat within torpedo range, preferably forward of the beam.

Now, if while the submarine is below the merchant ship changes her course, say, through an angle of 45 degrees, the former, on coming up for a few seconds' look at the ship, finds that, instead of converging to meet him, the merchant ship is sailing in a direction entirely different from that on which his calculations were based; his maneuver for getting into firing position goes for nothing, and he has to try again. Unless he is satisfied that his guns can greatly outrange the enemy, the U-boat commander does not dare to use his surface speed, and below the surface he has not sufficient speed to overhail the merchant ship. One or two misjudgments of this kind will lose so much time that the ship will have a good chance to pass him and steam beyond torpedo range.—*Washington Evening Star*, 24/3.

ATLANTIC

EXPLOSION ON U. S. S. "MANLEY."—The Navy Department has received dispatches from Vice Admiral Sims, U. S. N., commanding the American naval forces in European waters, stating that the U. S. destroyer *Manley* collided with a British man-of-war on March 19. A depth charge on the *Manley* exploded, damaging both vessels, killing one officer and three enlisted men and injuring a number of others.

Lieut. Commander Richard McCall Elliott, Jr., executive officer, was killed.

Lieut. Commander Elliott was born in Philadelphia, Pa., on April 12, 1888, and entered the service under an appointment as a midshipman from the eighth congressional district of Pennsylvania, August 17, 1905; was appointed an ensign June 5, 1911; promoted to lieutenant (junior grade) June 5, 1914; lieutenant, June 5, 1917; temporarily appointed a lieutenant commander from February 1, 1918, while serving on the U. S. S. *Manley*. In the spring of 1915 he distinguished himself for bravery when a forward boiler blew up on the *Alwyn* off Cape Hatteras. Lieutenant Elliott was then serving as torpedo officer, and did fine work in the rescue of men at night during a heavy sea, entering the boiler-room and assisting in bringing out the injured. He later served on the destroyer *McDougal* and at the torpedo factory at Newport.—*Army and Navy Journal*, 23/3.

ADDITIONAL DEAD, MISSING, AND UNIDENTIFIED ON U. S. S. "MANLEY."—Admiral Sims cables to the Navy Department that the latest reports on the casualties in the crew of the U. S. S. *Manley* are as follows:

One officer dead; 14 enlisted men dead, identified; two enlisted men dead, not identified; 17 missing; six seriously injured; 16 slightly injured. Nine officers and 55 enlisted men escaped without injury.—*Official Bulletin*, 26/3.

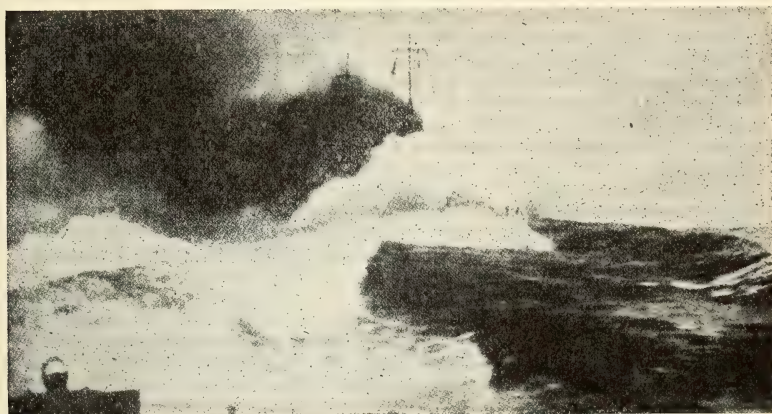
U. S. PATROL VESSEL SINKS.—The Navy Department announced on March 26 that the U. S. S. *Admiral*, scout patrol vessel No. 967, ran on the rocks of Scituate, Mass., March 25, and is a total loss. All the officers and crew were saved and considerable small material was taken off the vessel. The *Admiral* was a converted yacht, which, before being taken over by the navy, belonged to Gordon Dexter, of Boston.—*Army and Navy Journal*, 30/3.

U. S. S. "VESUVIUS" GOES AGROUND.—While making her way out of the harbor early on March 27 the U. S. S. *Vesuvius* ran ashore near Lovell's Island in Boston harbor. Signals for assistance were sent out and she was

pulled off and taken to the Boston Navy Yard to see if she had sustained any damage. The ship had left the navy yard after having been drydocked and cleaned.—*Army and Navy Journal*, 30/3.

ATTEMPT TO SALVAGE "ADMIRAL."—An attempt is to be made to salvage the *Admiral*, one of the boats attached to the first naval district, which sank in 15 fathoms of water off Plymouth on March 26. The *Admiral* is of about 110 tons. The work of salvaging was started on March 28 under the direction of an officer from the Boston Navy Yard.

Eight days will be required to repair the damage to the U. S. S. *Vesuvius*, which ran ashore near Lovell's Island on March 26. Some of the bottom plates have buckled and rivets have been torn away. The ship is now in dry dock at the Boston Navy Yard and the repair work will be rushed.—*Army and Navy Journal*, 6/4.



MARINE VIEW OF MAST OF SHIP "WIRELESS."

U. S. DESTROYERS SINK TWO U-BOATS.—Two more German submarines have, it seems certain, been sent to the bottom to stay there for good by two U. S. destroyers, according to an unofficial account printed in London on March 30. The first destroyer after the submarine submerged could see her wake, which showed it was running from starboard to port. As the submarine passed under the stern of the destroyer the latter dropped a depth charge and large quantities of oil came to the surface, which proved that the submarine had been ripped open. The second destroyer, engaged in night convoy duty, sighted a submarine a mile away, by the light of the moon. The submarine dived while the American destroyer was still a few hundred yards distant. Two depth charges were dropped and oil came to the surface. This submarine was apparently lying in wait for another convoy, which was approaching from an opposite direction.—*Army and Navy Journal*, 6/4.

"MANLEY" REACHES PORT.—London, March 21.—The United States destroyer *Manley*, on which an officer and some of the men were killed as a result of a collision, has arrived at a British port, according to an Associated Press dispatch received to-night.

An Irish Port, March 22.—The bodies of three men from the United States destroyer *Manley* have been brought here to be embalmed for removal to America.

Fire broke out in the afterpart of the *Manley* and the depth charge kept there was immediately thrown overboard in the hope that the vessel would steam clear. The explosion, however, blew off the afterpart of the vessel. Several survivors were landed and are now in a hospital.—*Washington Evening Star*, 22/3.

BIG WAR SUPPLY SHIP VANISHES WITHOUT TRACE.—The naval collier *Cyclops*, 19,000 tons, with 293 persons aboard, has been overdue at an Atlantic port since March 13 and has virtually been given up as lost by the Navy Department.

The disappearance of the vessel, which last reported at a West Indian port on March 4, probably will prove to be not only one of the most serious naval disasters suffered by the United States during the present war, but remain one of the unsolved mysteries of the sea.

On board the vessel, which was under the command of Lieutenant Commander G. W. Worley, United States Naval Reserve Force, were 15 officers and 221 men of the crew and 57 passengers. Among the latter was Alfred L. Morean Gottschalk, of New York, American Consul General at Rio de Janeiro, who was returning to the United States.

The Navy Department, in announcing to-day the *Cyclops* had been overdue for upward of a month, said that the search for her was being continued. Wireless calls have been sent out from every possible point along the route she was to take, but no answering call has been received. Naval vessels have searched for her without finding a trace.

In its official statement the Navy Department says that extreme anxiety is felt for the safety of the vessel. Naval officers, who are unable to find any adequate explanation for her disappearance, are of the opinion that the collier has been sent to the bottom.

The mystery recalls the "spurlos versenkt" message of Count von Luxemburg, formerly German chargé d' Affaires in Argentina. It is regarded as possible that the *Cyclops* might have been "sunk without a trace" by a U-boat operating in West Indian waters. No attack, however, has been made on any other vessel in this region, so far as is known in Washington. The presence of a submarine has not been reported from any source.

The weather in the region which the *Cyclops* was to have travelled has not been unusually stormy. The theory that the collier was sunk by an internal explosion is also scouted by naval officers. The explosives carried in her magazines were not sufficient to sink her before wireless calls could be sent out, and it is improbable that sufficiently powerful bombs could have been placed in her hold by enemy agents to destroy her without a trace.

One of the two engines of the *Cyclops* was damaged and she was running at reduced speed with the other engine compounded, but even if totally disabled the ship could have used storage batteries to send out radio calls for help.

Concerning the disappearance of the vessel the Navy Department to-day issued the following statement:

"The U. S. *Cyclops*, navy collier of 19,000 tons displacement, loaded with a cargo of manganese, and with a personnel on board of 15 officers and 231 men of the crew, and 57 passengers, is overdue at an Atlantic port since March 13. She last reported at one of the West Indian islands, on March 4, and since her departure from that port no trace of her nor any information concerning her has been obtained. Radio calls to the *Cyclops* from all possible points have been made and vessels sent to search for her along her probable route and areas in which she might be, with no success.

"No well founded reason can be given to explain the *Cyclops*' being overdue, as no radio communication with or trace of her has been had since leaving the West Indian port. The weather in the area in which the vessel must have passed has not been bad and could hardly have given the *Cyclops* trouble. While a raider or submarine could be responsible for her loss,

there have been no reports that would indicate the presence of either in the locality in which the *Cyclops* was.

"It was known that one of the two engines of the *Cyclops* was injured and that she was proceeding at a reduced speed with one engine compounded. This fact would have no effect on her ability to communicate by radio, for even if her main engines were totally disabled, the ship would still be capable of using her radio plant.

"The search for the *Cyclops* still continues, but the Navy Department feels extremely anxious as to her safety."

The *Cyclops* was built at the shipyard of William Cramp and Sons, Philadelphia. The keel was laid on June 2, 1909; she was launched May 7, 1910, and was commissioned November 7, 1910. She had a displacement of 19,000 tons. Her length over all was 542 feet, beam 65 feet, mean draft, loaded, 27 feet 8 inches, and cost \$923,000.

For many days the naval authorities have clung to the hope that the ship would be found or that information would be picked up indicating how she met her fate, but to no avail. The sea has been swept by wireless calls and naval vessels have searched carefully for traces of her but the mystery of her disappearance has remained unfathomed.

Naval officers admit, that the collier might have been attacked by a submarine or a sea raider, but the theory is all but disapproved by the fact that neither a submarine nor a raider has been seen in these waters. In either event the radio apparatus could have been used unless the ship were taken entirely unawares and it had been disabled before calls could have been sent out. The same would have been true had the *Cyclops* struck a mine carried far from its moorings.

The route the *Cyclops* would have taken after leaving the West Indies was one of the ocean lanes of travel where steamships are frequently within sight and seldom more than 50 miles away at any point. It is quite improbable that any call the *Cyclops* might have sent out would not have been picked up by a passing vessel.

The theory of an internal explosion is also discredited. There were small magazines on the *Cyclops*, one forward and the other aft. In neither was there a large quantity of ammunition. Naval officers, some of whom hold that a magazine explosion offers the most reasonable explanation for the disappearance of the vessel, are mostly of the opinion that it would have remained afloat long enough to send out distress signals. It is also doubted that a sufficient quantity of explosives could have been placed in the cargo to sink the vessel at once.—*N. Y. Herald*, 15/4. 1918

MONROVIA BOMBARDED.—Washington, April 12.—A German submarine of the largest seagoing type appeared April 10 in the Port of Monrovia, the capital of Liberia, on the west coast of Africa and bombarded the wireless and cable stations there, the State Department has been informed in an official dispatch.

The submarine threw scores of shells from her deck guns into the wireless station, causing extensive damage. She had just turned her attention to the cable offices when a steamer was sighted passing the harbor mouth. The submarine left in chase and did not return.

Liberia is a negro republic with a population of between one and two millions. It declared war on Germany August 4, 1917. Relations had been broken previously, but the war declaration permitted the internment of many German merchants and others who had been accused of unneutral activities.

The information reaching the State Department came from Robert C. Bundy, in charge of the American legation at Monrovia. The first message he sent indicated his belief that the submarine would have no difficulty in completing her object of utterly destroying all means of communication with the outside world. A later message told of the sudden departure of the U-boat.

About six weeks ago the captain of an American merchantman reported to the Navy Department having sighted a similar boat in the South Atlantic.—*Baltimore Sun*, 13/4.

U-BOAT AT MONROVIA KILLED THREE CHILDREN.—Washington, D. C.—Three children were killed when the German submarine bombarded the port of Monrovia, capital of Liberia, on April 10, the State Department was advised in a report to-day from Mr. Bundy, the American Chargé. Three persons were injured. The bombardment followed a demand upon the Liberian Government that it destroy the French wireless station at Monrovia.—*N. Y. Herald*, 17/4.

LOSS OF "CYCLOPS" REMAINS MYSTERY.—Washington, April 16.—Disappearance of the navy collier *Cyclops*, with about 300 aboard, promised to-day to go down in the annals of the sea as one of the strangest mysteries ever known.

The navy, though still searching the tropic seas, has virtually abandoned all but the one-millionth hope of finding her or any traces of her crew. The strange engulfing of the ship in the waste of waters lent itself to many romantic tales of plots to wreck her, but thus far Captain Wells' intelligence officers have been unable to establish the truthfulness of any of the stories.

A complete tabulation of intelligence reports from all corners of the world seemed to dissipate the theory that a German raider or submarine had again slunk into the western Atlantic.

So to-day many here turned more to the theory that plotters within wrecked the engines, put out of commission the wireless and somehow spirited the ship away to some out-of-the-way port or scuttled her en route to home port.—*Baltimore Evening Sun*, 16/4.

PROTECTED AGAINST ORE GAS.—Manganese ore, with which the *Cyclops* was heavily laden, might under certain conditions give off an extremely dangerous gas. Precautions had been taken against this, however, on all ships engaged in the manganese carrying trade.—*N. Y. Herald*, 17/4.

FEAR THE "CYCLOPS" MAY BE VICTIM OF GERMAN TRICKERY.—The suspicion that the naval collier *Cyclops* may still be afloat, although overdue for more than a month, is leading to a renewal of the search for her by French and American ships with greater vigor than ever. Fast scouts have been sent out to look for her, and the area which they will cover will probably be extended beyond the vicinity of the route the missing vessel was to have taken on her way from Barbadoes to the United States.

The fact that no trace of wreckage has yet been found is regarded as an ominous sign by naval officers. If the *Cyclops* had been sunk by a torpedo, time bombs placed in the hold or engulfed by a hurricane it is probable that the life-rafts with which she was equipped would have remained afloat as well as her boats.

Nothing has yet been found to prove that the collier was sunk. Neither has any satisfactory theory been advanced to account for her disappearance. No distress call was sent out, and it would be only by chance that her radio equipment would have been put out of commission.

For these reasons the suspicion that the ship might have been captured through the machination of German agents is growing. Through a conspiracy mutineers might have obtained control of the vessel, but it is not regarded as probable that she would undertake a transatlantic voyage, because, so far as known in Washington, there was not sufficient coal in her bunkers.—*N. Y. Herald*, 17/4.

OUR SUBMARINES OFF GERMAN BASES.—Washington, April 9.—In the face of bitter winter gales, American submarines, primarily designed for opera-

tions off the home coasts, have crossed the Atlantic to engage in the common fight against German U-boats. They are now aiding allied naval forces, as are American destroyers and American naval airmen, and they have been in the war zone for some months.

Secretary Daniels revealed the fact that the submarines had gone "over there" in his address at Cleveland, Saturday at a Liberty Loan celebration, but gave no details. It is now possible, however, to tell for the first time of the mid-winter passage of the boats across the seas in the face of the most severe weather known in years. In the perilous passages, the best traditions of the service have been maintained.

The first submarines to leave got under way in early winter. Arrangements for the trip were made without a hint appearing in the papers, and, in fact, until Secretary Daniels spoke, no word of the participation of the underwater boats in the war against Germany had been published.

The navy had some experience with long-distance work with submarines on which to draw. Boats have been sent to the Philippines, to Hawaii, and to Panama, but always in mild seasons of the year and with plenty of time for precautionary steps.

This time, however, they were to go in winter, and a terrible winter at that, with the Atlantic in its ugliest mood. The steps taken to get them across cannot be disclosed. But the fact that the department has no disaster to record is pointed to as proof of their sufficiency.

Officers and men of the submarines faced hard days as they put out. Cramped in narrow quarters and with storms in prospect they steered to sea with complete confidence in themselves and their boats. A laconic report of uneventful voyages bore out that confidence.

In mid-December others got started. While it was fair on sailing day, ahead of the submarines a 100-mile gale was brewing. Into it they plowed, rolling and tumbling. Details of the commander's report have not been made public, but among the crews undoubtedly were men who recalled the first employment of the submarines at maneuvers, when seasickness all but put the flotilla out of commission.

But there was no faltering. The boats were going to the front in real warfare this time. Even when tow-lines parted in some cases, unknown to the tugs and accompanying craft, the submarines battled forward alone. A majority of them reached their destination under their own power, ready for duty.

Some of the boats were driven far from their course. They showed up at different ports, but promptly put to sea again and reached their station.

One boat was the hard-luck vessel of the lot. Separated from the flotilla in the first storm and its compasses out of order, it turned homeward, only to strike two more gales in quick succession. However, it made port successfully and undamaged. With new fuel and supplies aboard and with a man or two, worn out by the long struggle with the elements, replaced, in a few days the boat put to sea again. It went through that time, despite a fourth gale it encountered.

Little has been said of the work of the British and French submarines in the U-boat hunt. They are playing a definite part, however, and lurking close to enemy bases. There have been encounters between submarines, some of which read like fiction. The service has been described as a trying one, for which men of courage and daring are needed. It is in this work, presumably, that the American submarines are engaged.—*N. Y. Times*, 10/4.

ONE HUNDRED AND FIFTY U. S. WARSHIPS FIGHTING SUBMARINES.—Cleveland, April 6.—A great fleet of American warships, numbering more than 150 vessels, and including, in addition to the far-famed destroyers, battleships, cruisers, submarines, gunboats, coast guard cutters, converted yachts, tugs and other auxiliaries, is operating in the war zone.

Manning this fleet and the many small submarine chasers, which are not reckoned in the total, and doing duty on air patrol and at the supply stations ashore, are 35,000 officers and men, half the navy's personnel when the nation entered the war just a year ago.

These hitherto carefully guarded facts were disclosed here to-day by Secretary Daniels in an address at a celebration marking the opening of the third Liberty Loan campaign. Mr. Daniels said that while he was not at liberty to tell the toll the fleet has taken of German submarines, the nation could "rest assured that our forces have inflicted losses upon the enemy."

"As an instance of naval activity," said the Secretary, "I may cite the work of one detachment of destroyers for a six-month period: Total miles steamed in war areas, 1,000,000; submarines attacked, 81; single vessels escorted, 717; convoys escorted, 86; total number of days at sea, 3600.

"The navy has furnished every aid possible that the countries aligned with us in the war have requested or suggested and has worked in the closest co-operation with them. Our forces have played an important part in the war against the submarines and have aided materially in the marked reduction in sinkings of merchantmen, as compared with the number sunk in the corresponding period a year ago, and in a no less notable increase in the number of submarines destroyed."

Under Vice Admiral Sims, who is in supreme command of all the American naval forces in the war zone, are four rear admirals, with stations in Europe, said the Secretary. They are Henry B. Wilson, in France; Albert T. Niblack, in the South; Hugh Rodman, in command of battleships; and Herbert O. Dunn, on special duty.

America's fighting ships, Mr. Daniels asserted, have been self-sustaining, with the assistance of repair ships, except for major repairs and docking. Schools and barracks have been established to house the men, who, when trained, go aboard ship, relieving nucleus crews of men of long service who are sent home to bring out new units. Commanding officers trained in the war zone are returned to America to take new vessels into the war zone.

Torpedo stations and aviation bases also have been established abroad, and the Secretary announced that American Navy aviators are co-operating with those of England, France, Italy and Portugal.—*Baltimore Sun*, 7/4.

PORTUGAL FOR U. S. BASE ON AZORES.—Washington, April 12.—For the protection of the Atlantic trade routes to southern Europe, the United States, with the consent of Portugal has established a naval base on the Azores Islands.

Guns have been landed to begin fortification of the station which in addition to being used as a naval base for American submarines, destroyers and other small craft, also will serve as an important homing station for American airplanes, a number of which already have been assembled there.

Negotiations now are in progress between the State Department and the Portuguese Government to insure full co-operation between American naval forces and the local authorities of Portugal on the islands for the adequate defence of the station. This action will simplify the task of protecting the great trade routes not only to southern Europe and the Mediterranean, but also returning traffic to South America and southern Gulf ports in the United States.

Portugal was not only willing to enter into the arrangement, but was eager to see it perfected that her own lines of communication to her colonial possessions would be covered. The value of the new station as a base for the replenishment of supplies for American submarines, submarine chasers and destroyers on the voyage to Europe already has been demonstrated.

It is permissible to disclose these facts now because it is known to the government that they are known in Germany.

The Azores, a constituent part of Portugal, lies in the Atlantic about 750 miles west of Gibraltar and 1400 miles east of New York. Many of the islands are uninhabited, and since the German unrestricted submarine warfare began there have been several reports that one of the islands had been used as a submarine base by the Germans. Numbers of vessels have been sunk by submarines in the vicinity of the Azores.

The chief ports on the islands are Horta, on Fayal Island, and Ponta Delgada, on Sao Miguel Island. Horta is frequently used by vessels running short of coal and supplies, and is the stopping place of some vessels trading between the Mediterranean and the United States, as well as steamers trading between Europe and South American and South African ports.

The Azores are the landing place of the only cable line which connected Germany directly with the United States before the war. Shortly after hostilities began this cable was cut, presumably in the English Channel, through which it runs, thereby stopping messages between New York and Emden, Germany. There are four wireless stations on the islands.—*Baltimore Star*, 12/4.

AZORES NAVAL BASE STORY DENIED.—The naval authorities make no concealment of their displeasure over the announcement that this country, "with the consent of Portugal, has established a naval base on the Azores Islands." As a matter of fact there is no justification for any such statement. This country, in common with France and Great Britain, is making use of harbors for the relief and supply of American ships on duty in foreign waters. Beyond this, nothing has been done and nothing is in contemplation, it is stated at the Navy Department. A similar announcement was made a short time ago in Germany and it is now stated that it is on the strength of this German knowledge of our purpose the present revelation is permissible. The facilities which exist in the Azores will be availed of without the formality of creating a permanent base.—*Army and Navy Register*, 13/4.

U-BOAT SUNK, NINE OF CREW TAKEN ALIVE BY AMERICAN TRADE SHIP.—The first report of the capture alive of German submarine prisoners by the crew of an American merchant vessel was brought to an Atlantic port by passengers arriving on board a French steamship. They told that nine prisoners had been taken and the American steamship also succeeded in sinking the undersea raider, that went down with a suicide captain.

The encounter between the American steamship and the submarine occurred on March 10, when the former was only two days away from a French port, it was said. W. S. Hambling, connected with the Ordnance Department, U. S. Army, and one of the returning voyagers, told of the capture. His report was corroborated by two other passengers. The steamship which sunk the U-boat was under charter to the United States Shipping Board and was formerly of the American-Hawaiian line.

"I saw the nine prisoners march down the gang-plank at the French port," said Mr. Hambling. "I then heard the story, which was that the steamship was two days out of the port when it had a running fight with the submarine. The nine prisoners were the only survivors picked up. When the submarine captain saw his boat was about to be lost he shot himself dead."—*N. Y. Herald*, 25/3.

MERCHANT SHIP GUNNERS SINK THREE U-BOATS.—Liverpool, March 8.—Three Liverpool steamships have sunk three German submarines in the Atlantic recently and it is now permitted to relate the circumstances.

In the first instance, a Liverpool steamship was fired upon by a submarine in the Atlantic at daybreak. The steamer paid no heed to the shots and kept on her course. The submarine followed cautiously along the surface, keep-

ing up a long-range bombardment for an hour and a half. Suddenly the ship slowed down and the boats were lowered, apparently indicating that the captain had received all the punishment he wanted and was abandoning his ship. The submarine commander, fearful of a trap, circled around the ship several times and then came closer to the vessel.

The last act came very swiftly. There was a sharp sound of falling timbers as a false side dropped away, and then six explosions as a gun spoke six times. Four of the shots hit the mark, destroying the conning-tower and disabling the German gun. The submarine's bow rose high in the air and then slipped down into the water, like a gigantic dart.

A second Liverpool steamship was outward bound at a speed of 8 knots when a torpedo passed 20 feet astern. As the vessel was turned a second torpedo missed her bow. The guilty periscope was observed a quarter of a mile away and the gun crew began firing. The first shot went too high, but the second and third exploded on hitting the enemy, which disappeared amid a great pool of bubbles and oil.

A sailing ship accounted for the third submarine. The ship was fired upon by a U-boat just before noon. As the German came within range his fire was answered, the sailing vessel firing 13 shots. The chief gunner was a former petty officer in the British Navy and he scored eight bull's-eyes in a space of less than two minutes. His report says:

"The bows of the submarine disappeared and the stern rose clear out of the water. She remained in this position for about 15 seconds and then disappeared. A minute later the stern and rudder came up again, and remained steady above the water, at an angle of 30 degrees, for a few seconds, before passing finally from view."—*Washington Evening Star*, 28/3.

THREE U-BOATS SUNK BY OUR DESTROYERS.—London, March 30.—Three encounters in which American destroyers sank German submarines, are described in a series of accounts of successful submarine battles published recently.

"The first American destroyer," says the article, "sighted the enemy submarine on the port bow and proceeded at full speed in the direction of the enemy, who submerged. The American officers could see the enemy's wake, which showed he was running underneath the surface from starboard to port. As the German passed under the stern of the American boat the latter dropped a depth charge. The wake which had been plainly visible on the starboard never appeared on the port side of the destroyer. Instead, large quantities of oil came to the surface.

"A second American destroyer, engaged in night convoy duty, sighted an object a mile away by the light of the moon. Full speed was ordered, but the submarine dived while the American destroyer was still a few hundred yards distant. Two depth charges were dropped and oil came to the surface. This submarine was apparently lying in wait for another convoy which was approaching from an opposite direction."—*N. Y. Times*, 31/3.

SHIPS IN FLAME BLAST.—An Atlantic Port, April 17.—Thirty-seven lives were lost when the American steamship *O. B. Jennings* and the British steamer *War Knight*, both laden with naphtha and inflammable oils collided off the British coast on March 24, according to members of the crew of the *Jennings*, who arrived here to-day. All who perished with one exception were on the British vessel. They were burned to death by blazing gas and oil. Those who survived were rescued in the nick of time by destroyers, for soon after, while the blazing *War Knight* was being towed toward shallow water, it struck a mine and was blown up.

The destroyers went to the rescue through a field of blazing oil and took off also the crew of the *Jennings*. A number of the crew of the American ship, however, were badly burned and had to be removed to hospitals after being landed.

An officer of the *Jennings*, who told the story, supported in his statements by members of the crew, said the collision occurred shortly after 2 a. m., when they were within 15 miles of their destination. He added that it was caused by the necessity of running without lights owing to submarine danger.

"We had had an exceptionally rough trip," the officer said. "As a result the churning of the bulk oil we carried had caused a tremendous amount of gas. When the *War Knight* hit us there was an instant explosion, caused, no doubt, by a spark from the impact of the steel setting the gas on fire.

"Immediately there was a roar of flame spouting out of the hole in the *O. B. Jennings'* side which all but enveloped the Britisher. I learned afterward that 36 of her crew of about 50 were on the deck at the time and they must have been almost instantly incinerated.

"We drifted apart and one of the destroyers by which we were convoyed managed to get a line on her and was towing her toward the beach when in some manner the burning ship drifted onto a mine-field and she blew up. The case oil with which she was loaded took fire and completed her destruction.

"We had our own safety to look after. The burning naphtha had poured out onto the sea and it would have been folly to launch life-boats. It was then that the destroyers showed their resourcefulness for they dashed through the burning oil, bumped alongside of us and we jumped to their decks in safety. We lost only one man, a seaman named Shea, who was either burned or fell overboard and drowned.

"The *O. B. Jennings* being a menace to other ships the destroyers proceeded to sink her, which they did with a number of shots. She settled until her decks were level with the water, extinguishing the flames, and afterward she was taken in tow and beached. She probably is not a total loss."—*Baltimore Sun*, 18/4.

PROWLING U-BOAT SUNK BY GUNNERS IN THREE MINUTES.—Just how American gunners deal with submarines which cross their path in traversing the Atlantic was described yesterday by one of the men who had to do with the sinking of a U-boat three minutes after it showed its steel eye above the water off the coast of France on April 4. The sinking of this U-boat was announced exclusively in the *Herald* yesterday.

Three minutes, this seaman thinks, is ample to get the best of the biggest submarine if weather conditions are such as to make target practice possible. The marksmanship of Uncle Sam's gunners is excellent, he said, and even so small a target as a periscope, if within torpedo range, is sufficient to prove their skill.

This particular transport was one of a fleet of five ships that left France March 24 for the return trip to America. After waiting several days for an escort, the fleet finally started across the ocean in convoy of several American destroyers. Two days of uneventful travelling convinced the commander of the convoy fleet that their services would not be required and they turned toward more active waters.

"We were all anxious to get a crack at one of those U-boats," said the seaman. "We knew it was up to us now that the convoy was gone, and we redoubled our efforts to get a slant at one of them. Each vessel hoped that the distinction of being the first to sight one would belong to it.

"It wasn't long before the opportunity came. At least one 'sub' had been following us all along, just waiting for this chance to get a shot at us. The last of the destroyers had hardly passed out of sight when the officer on the bridge of our troop-ship saw something in the water and turned his glass on it.

"Sure enough it was a periscope. She was coming up out of the water fast and evidently ready to go into action. But we were just as ready as Fritz was. The U-boat was fully 1000 yards away on the port side.

"The officer had to act quick, but he was ready for it. He gave his orders to steer straight for the periscope, giving the narrowest target and giving Fritz the scare of his life at the same time. At the same moment, the officers ordered the gunners to open fire.

"Two minutes later a shot hit the water not far from the periscope. Two more shots were fired. Both went wild, because we were still turning.

"The other transports fell back, leaving us a clear field. It was Fritz and us. Everybody on board was impressed into service carrying ammunition up from below. We didn't know how long the fight might last and we were ready to carry it to a finish. We knew that the destroyers weren't far away, but we were ready for anything that might happen.

"Then the boys got in their fourth shot. It was the first one they had fired with the ship actually sailing straight, so that they could take aim. It was some shot!

"We heard the bark of the gun, then saw something shoot up in the air and heard another muffled explosion. It was the periscope going up in the air and the sub going down. We had hit it right in the middle, carrying away everything that was over the water. The officer on the bridge ordered the boat to cross the spot twice to get anything that might be afloat. But it was unnecessary. Nothing remained on the surface but oil."—*N. Y. Herald*, 15/4.

NORTH SEA AND CHANNEL

H. M. DESTROYER "BOXER" SUNK IN COLLISION.—Admiralty, February 11.—H. M. destroyer *Boxer* was sunk on the night of February 8, in the Channel, as the result of a collision. One boy was missing.—*United Service Gazette*, 14/2.

UNSUCCESSFUL ATTACK ON HOSPITAL SHIP.—March 14.—London announces that the British hospital ship *Guilford Castle* was unsuccessfully attacked at the entrance of Bristol Channel. She was flying Red Cross flags and had all the hospital lights on. This is the second attack of German submarines on a hospital ship within a month.—*Literary Digest*, 30/3.

NAVAL ACTION OFF DUNKIRK.—Vice Admiral Douer of the French Navy reports that an action occurred off Dunkirk between 4 and 5 o'clock a. m., March 21, in which two British and three French destroyers were engaged with a force of German destroyers which had previously bombarded Dunkirk for minutes. Two enemy destroyers and two enemy torpedo-boats are believed to have been sunk. Survivors have been picked up from two enemy torpedo-boats. No allied vessels were sunk. One British destroyer was damaged, but reached harbor. The British casualties were slight. There were no French casualties.—*Army and Navy Journal*, 30/3.

A German official account of the fight between German and allied small sea forces on the French coast off Dunkirk and vicinity on March 21 says: "German torpedo-boat forces from Flanders, in three groups, subjected the fortress of Dunkirk and military establishments near Bray Dunes and Depaume to a long bombardment early on March 21. Good effects were secured everywhere. Two large fires were started in an extensive barracks camp near Depaume into which 800 shots were fired. The coastal batteries replied with a violent but unsuccessful fire. On the return a fight occurred with some destroyers, which, however, withdrew after being several times hit. The forces which participated in the attack returned without damage or loss. Two of our small outpost vessels had not returned from a cruise west of Ostend and must be considered missing."—*Army and Navy Journal*, 30/3.

BRITISH DESTROYER CUTS HUN WARSHIP IN HALF IN FIGHT.—London.—In the engagement between allied and enemy destroyer squadrons off Dun-

kirk last Thursday the British destroyer *Botha* cut a German warship in half and took a leading part in the fight, although her main steam-pipe had been severed by a stray shell.

Early last Thursday morning the British destroyers *Botha* and *Morris* and the French destroyers *Capitaine Mehl*, *Magon* and *Bouclier* were patrolling the eastern waters of the English Channel when they heard enemy ships bombarding the coast of Dunkirk. They fired star shells, which had the effect of silencing the bombardment and scattering the enemy.

The destroyers started in pursuit of the Germans in a northwesterly direction and discovered eventually that the enemy ships were making for their base. A grim little fight ensued, according to the stories of eye-witnesses.

None of the German torpedoes found a mark, but the *Morris*, emerging from an enemy smoke screen, cut off a German destroyer of a large type and torpedoed her at a range of 500 yards. There was an explosion in the enemy vessel and she sank immediately.

Meanwhile the *Botha* had been crippled and she began to lose her way. The crew determined to do what damage they could and fired both their torpedoes at the two leading enemy boats. Then, her helm having been put hard over, the *Botha* rammed another boat cleanly amidships, cutting the enemy vessel in half.

Tries to Ram Second Hun Ship.—Swinging around, the *Botha* attempted to repeat the ramming maneuver on the next German astern. The enemy craft, however, eluded the effort of the crippled Britisher, but only to fall a victim to the French destroyers. Ablaze, the German boat lay disabled, while the Frenchmen pounded her with torpedoes and gun-fire.

The *Morris* lost the rest of the quarry in the mist and took the lame *Botha* in tow, while the French destroyers circled around, picking up prisoners. From the statements of prisoners it appears that 18 German craft participated in the raid, and when they fled from the French coast, leaving three of their number behind, they were attacked by a British naval air squadron which pelted them with bombs and scattered them in disorder in all directions.

(Two German destroyers and two German torpedo-boats were believed to have been sunk in the action off Dunkirk, according to an announcement made by the British Admiralty on March 21. It was said that no allied vessels were sunk and that one damaged British destroyer had reached port.)—*N. Y. Herald*, 27/3.

BRITISH MONITORS BOMBARD OSTEND.—A successful bombardment of Ostend on March 22 by British monitors is reported by the British Admiralty. The official report also says: "Prior to the bombardment four enemy aircraft were destroyed by our naval air squadron. Enemy aircraft attacked the British machines while spotting for the bombardment, with the result that another enemy machine was destroyed. British seaplanes engaged in reconnaissance in Heligoland Bight attacked enemy mine-sweepers with machine gun-fire. There were no casualties on the British side. All our machines returned safely."—*Army and Navy Journal*, 23/3.

BRITISH DESTROYER SUNK IN COLLISION; TWO DROWNED.—London, Monday.—A British destroyer was sunk on March 23 in a collision, the Admiralty announced to-night. One officer and one of the crew were drowned.—*N. Y. Herald*, 26/3.

"U-48" INTERNED.—The German submarine *U-48*, which sought refuge in the port of Ferrol, Spain, was interned on March 25. Her propellers were unshipped by the port authorities and her guns and munitions were taken out. It is understood that most of the crew of 30 will be interned at Alcala de Henares, 17 miles northeast of Madrid.—*Army and Navy Journal*, 30/3.

MINE-SWEEPER SUNK.—The British Admiralty announced March 25 the sinking of a mine-sweeping sloop through striking a mine on March 22. Two officers and 64 men were lost.—*Army and Navy Journal*, 30/3.

BRITISH DESTROYER SUNK BY MINE.—A British destroyer struck a mine March 27 and sank, it is officially announced. One officer and 40 men were lost.—*Army and Navy Journal*, 6/4.

ARMED BOARDING STEAMER TORPEDOED.—The British armed boarding steamship *Tithonus* was torpedoed and sunk by a German submarine on March 28, according to an official statement issued by the Admiralty. One officer and three men were lost.—*Army and Navy Journal*, 6/4.

BRITISH DESTROYER SUNK IN COLLISION.—A British torpedo-boat destroyer was sunk on April 1 as a result of a collision, according to an official statement issued by the Admiralty. All on board were saved.—*Army and Navy Journal*, 6/4.

BRITISH TORPEDO-BOAT DESTROYER SINKS AFTER COLLISION.—London, April 9.—A British torpedo-boat destroyer sank last Thursday as the result of a collision and all hands on board are believed to have been drowned, according to an Admiralty statement issued to-night. The statement says: "One of his Majesty's torpedo-boat destroyers sank on the 4th instant, as the result of a collision in the foggy weather. All hands are missing, and it is presumed they were drowned."—*Baltimore Sun*, 10/4.

AMERICAN TANKER SINKS U-BOAT AT END OF FIGHT OF ONE HOUR.—An Atlantic Port, March 18.—At the end of an hour's battle between a German submarine and an American tank steamship, the *Paulsboro* of the Vacuum Oil Company, which arrived here yesterday, the U-boat apparently was sunk, according to officers of the American vessel.

One of the crew on the tanker was wounded by a shell fired by the submarine. Two other shots struck the American ship, which was not seriously damaged.

The fight took place in the Bristol Channel on February 24. The American vessel was about 24 hours out from a British port when the U-boat was sighted. The tanker tried to escape and was pursued. After the American vessel had been within torpedo range for some time without any attempt being made to sink her in this way the U-boat began shelling her.

The tanker halted and gave battle. The officers said the shrapnel shells fired by the American gun crew either fell short or passed over the U-boat for a time, but finally one struck the submarine fairly in the center and she disappeared immediately. The American vessel is of about 4000 tons gross.—*Washington Evening Star*, 18/3.

ANOTHER U-BOAT PROBABLY DESTROYED.—Chief Gunner's Mate Thomas J. Beerman, commander of the armed guard on the steamship *Boringuen*, has been commended by Secretary Daniels for cool and steady work displayed by his gun crews in probably destroying a German submarine the night of October 30, 1917.

An official account of the incident says that at 11.45 o'clock at night, during misty and foggy weather, the lookout of the *Boringuen* sighted a submarine lying to, apparently receiving news from her headquarters. Four shots were fired at the U-boat, and when last seen it was going down in an upright position.

In his report, Beerman praised the captain of the steamer for the excellent manner in which the ship was handled during the engagement.—*Washington Evening Star*, 18/3.

HUN SUBMARINE SUNK BY BRITISH SEAPLANE.—London, March 15.—Under a heavy attack from three German submarines and three German destroyers, a British seaplane recently persisted in her efforts against another enemy U-boat and succeeded in sinking it before being damaged by the fire of the other enemy warships. The seaplane was on patrol duty at 8.30 o'clock in the morning when a submarine was sighted on the surface, with a man standing forward by the gun.

Increasing her speed, the seaplane dropped to an altitude of 600 feet and released a bomb. As she swooped around to repeat the attack a shell from the U-boat burst in the air 50 feet from the propeller. It was seen that the bomb had made a direct hit, a big rent being visible in the deck of the submarine. Just then out of the mist appeared three more enemy submarines, followed closely by three destroyers. All six vessels maintained a hot fire against the seaplane. However, a second bomb dropped on the disabled U-boat. It exploded 15 feet ahead of the bow of the submarine. The whole craft shook and then sank quickly in a pool of oil, bubbles and wreckage. The seaplane, having no more bombs and as the destroyers were coming near, returned to its base.

Seaplanes also have accounted for three other submarines. In one case two large seaplanes attacked a submarine on the surface and with two Germans standing on the conning-tower. One plane dropped a bomb to the starboard of the U-boat, while the other placed one squarely in front of the conning-tower. The explosion of the second bomb was followed by several explosions within the submarine, which disappeared.

Diving from a height of 4000 feet to 1200 feet, another seaplane dropped a depth charge on the spot where a submarine had disappeared. When the water subsided the shape of the submarine could still be seen below the surface and a second bomb was dropped, "after which the ship disappeared."

An enemy submarine with two periscopes and about 200 feet in length, was sighted by a seaplane on patrol duty. The seaplane descended 3300 feet to a height of 800 feet and dropped two bombs as the German submerged. One of the bombs made a direct hit just behind the conning-tower. The submarine turned upside down and sank. Oil and wreckage later came to the surface.—*Washington Evening Star*, 1/4.

TEN U-BOATS ARE SUNK.—London, April 6.—Details concerning the destruction recently of 10 German submarines by naval aircraft, eight by seaplanes and the others by dirigibles has been obtained by the Associated Press from Admiralty reports. The first case is described as follows:

"While on patrol in the English Channel a seaplane sighted a submarine eight miles away, directly in the path of an oncoming convoy of merchant ships. The seaplane dived at 90 miles an hour. The submarine attempted to escape by submerging, but was just awash as the seaplane reached a bombing position and released two bombs, one of which exploded on the conning-tower. The seaplane dropped two more bombs into the midst of the air bubbles from the collapsed submarine, which was of the largest type, carrying two guns."

The second case: "At dawn a seaplane sighted a large submarine on the surface, with a member of the crew standing by the gun. The seaplane dropped a bomb on the tail of the U-boat, and afterward photographed the sinking submarine with a big hole in its deck. A second bomb was dropped close to the submarine's bow and the U-boat collapsed."

The third case: "Two seaplanes attacked a large submarine traveling on the surface at 14 knots, with two men in the conning-tower. A bomb was exploded close to the conning-tower and the submarine began to sink, stern first. A bomb from a second seaplane completed the work."

The fourth case: "Three patrol planes sighted a large submarine as it was submerging and dropped two bombs close to the conning-tower, caus-

ing the submersible to turn turtle and disappear in a mass of oil and wreckage."

The fifth case: "A seaplane sighted two submarines close to the surface and dropped two bombs. One bomb was ineffective but the other hit the deck fairly amidships. The submarine was hidden by the smoke of the explosion and when the smoke cleared the U-boat was sinking with both ends in the air."

The sixth case: "A seaplane saw the track of a torpedo fired at a merchantman. It dived toward the surface and sighted the black shadow of the submarine well below the surface. It dropped two bombs which both exploded close to the submarine, resulting in a large quantity of oil, bubbles and wreckage."

The seventh case: "Two seaplanes sighted a U-boat on the surface and dropped a bomb each. The first bomb caused a heavy list to the U-boat, which began to sink by the stern. The second bomb exploded in the center of the swirl, demolishing the U-boat."

The eighth case: "A seaplane dropped a bomb on a submarine just emerging and the U-boat disappeared with a heavy list to port. The pilot dropped a second bomb into the swirl and a few minutes later a patch of oil 150 feet long and 12 feet wide appeared on the surface."

The ninth case: "A naval airship at midday sighted a suspicious patch of oil and circled it in an effort to ascertain the cause. Suddenly a periscope broke the surface in the midst of the oil. The airship dropped a bomb close to the periscope and a series of bubbles began appearing, indicating that the damaged submarine was moving slowly away under the water. Several more bombs were dropped in the path indicated until satisfactory evidence was obtained of the enemy's destruction."

The tenth case: "An airship dropped two bombs over a submarine which was engaged in attacking merchantmen. Great patches of oil and bubbles indicated severe damage and trawlers made this complete by depth charges."—*Baltimore Sun*, 7/4.

BELGIAN RELIEF SHIP SUNK.—Amsterdam, April 10.—The Belgian Relief steamer *Flandres* struck a mine in the free channel Monday and sank, according to the *Handelsblad*. The crew were saved.—*Baltimore Sun*, 11/4.

THE WAR AT SEA.—By a British Naval Officer.—It is natural that the great offensive on the western front which began on Thursday, the 21st inst. at dawn, should occupy men's minds largely to the exclusion of other matters. For the moment the tonnage problem and even the submarine campaign attract less attention and the sea affair takes a second place in the public eye. It is as well, however, to remember that chiefly upon the security of the communications across the Channel rests the prompt and effective supply of men and munitions for the reinforcement of the fighting lines. Anything like interference on a large scale with the traffic in those waters would have a baleful effect upon the efforts of our armies now sustaining so manfully and courageously the destiny of the allied cause. The Germans—at all events those in high command—thoroughly realize that this is practically their final shot. Even if they win now they may still lose hereafter, but if they fail to win all is lost forever. Manifestly, then, all they have will be put into the endeavor. At any moment they may decide that the time has arrived for the employment of their sea forces to supplement the action of their troops. The high seas fleet, with every other unit of the German Navy, may be used to second the efforts of the army, and beyond a doubt all the machinery at the disposal of the Admiralty is being utilized to obtain early intelligence of movements in this quarter. It is quite possible that the recent appearances of German light craft in the Narrows to the northward of the Dover Straits were but feelers of our strength and preparation thereabouts. The tactical objective would be the Channel Guard, its purpose to open the gate and let through a shoal of

submarines to prey upon the traffic between our coasts and those of France. To strike such a blow light forces only would probably be used, but these would of necessity require for their support the appearance of the high seas fleet in the North Sea. Thus might be brought about the struggle for sea supremacy which has been impending ever since the war began, and which might conceivably furnish the decisive factor in the conflict.

If the recent enemy demonstration off Dover and Dunkirk was intended to test the vigilance of our patrols and the strength of our guard in that direction, it must have afforded the Germans evidence which could not have been satisfactory to them on either point. Their light forces did on the first occasion destroy a few guard vessels, but the cordon was re-established within a few hours. The second event gave them a taste of what they may expect if they try it again in greater numbers. The further details which the Admiralty has revealed of the affair which took place off Dunkirk simultaneously with the opening of the great offensive on land at dawn on Thursday in last week bear witness to the professional skill and dauntless courage of the Dover patrol. The meaning of the bombardment of Dunkirk and other points on the French coast in that neighborhood is not clear. The risk was great, the possible gain small. As a reconnaissance the effort was futile, and the moral effect likely to be trifling. Raids upon Dunkirk from Ostend and Zeebrugge have not been frequent. On March 26 of last year, about 2 in the morning, some German torpedo-boats threw about 60 shells into the town and then withdrew at full speed. There were two people killed on shore, victims of this attack. Early in the morning of the 24th of the following month, another German flotilla appeared off the town and opened fire, to which the coast batteries replied. On that occasion an Anglo-French patrol engaged the enemy, who at once withdrew in haste. A small French torpedo-boat was lost in this little action. Still earlier there had been some fighting in these waters, and in August, 1915, two French destroyers sunk a German boat. There may have been other affairs of a similar character, but as the Admiralty stated in a communiqué last November, "as they in no way interfere with the maintenance and efficiency of our patrol they are therefore not reported."

On the latest occasion, 18 German destroyers in three groups were sent out to bombard the French coast, and just before daybreak the flashes from their guns were seen by an Anglo-French flotilla patrolling in the neighborhood. This force consisted of the *Botha*, a flotilla leader (Commander Roger L'E. M. Rede), and the *Morris* (Lieut. Commander Percy R. P. Percival), both British craft, with three French destroyers, the *Mehl*, *Magon*, and *Bouclier*. Led by the *Botha*, the flotilla proceeded in the direction of the firing, and when the star shells fired by the British leader illuminated the enemy and disclosed their position, they scattered and fled. A little later the French and British boats overhauled a group of the retreating Germans and at once opened fire upon them. A torpedo from the *Morris* blew up one of the enemy destroyers at 500 yards range, and the *Botha*, losing speed, as her main steam-pipe had been severed by a shell, rammed another boat and sunk her. A third vessel was accounted for by our Allies. Thus the engagement was even more complete and satisfactory than appeared from the first accounts of it that were published.

It will be strange indeed if in any action in these narrow waters British aircraft do not play their part. On the morning after the fight in which Commander Rede had been given an opportunity for a display of his courage and decision with such an admirable result, a bombing squadron of the R. N. A. S. met one of the groups of retreating German destroyers and added to their discomfiture by a shower of missiles from aloft. Whether the airmen managed to hit the mark is not stated, but at least they gave the enemy a taste of what might be expected if further raids of the kind were attempted. Nor did the raiders get home without more trouble. Exactly what happened is not told, but as they reached the Ostend Mole, says the official communiqué, "something rushed across the face of the water in a

cloud of spray, apparently from nowhere, a sinister unseen thing travelling at incredible speed. A torpedo struck the stern of one of the German destroyers, and the cloud of spray tore away through a hail of shell of bullets, unscathed, and vanished in the mist."—*Army and Navy Gazette*, 30/3.

BALTIC AND CATTEGAT

FATE OF RUSSIAN FLEET.—Petrograd, March 10.—A former delegate of the Baltic Fleet has reported to the Petrograd Soviet that the whole of the Russian Baltic Fleet is lying at Helsingfors, that the crews have melted away, and that only a watch has been left in each ship. The dreadnoughts are soon leaving for Kronstadt, and the remainder of the fleet will be left in the hands of Finland (where power is practically in German hands), Kronstadt being unable to accommodate more.

The cruisers *Aurora* and *Diana* are lying in the Neva demobilized, all movable articles having been carried away by sailors. With the army gone and the fleet incapacitated, the Moscow Soviet is trying to organize new forces to fight Germany at some future date!

The Bolshevik Party Congress has resolved to change its title to the Russian Communist Party, and its program will be changed on lines which apparently will make the party international. The idea is that a type of republic should be established everywhere based on Soviet lines—i.e., a proletariat dictatorship and the continuation of the conquest of the *bourgeoisie*. The party resolved by a large majority to ratify the Brest Treaty.

According to a Russian Wireless Press message, in the Baltic the Russian transport ships *Russ*, *Nitava*, *Pallada*, *Merkury*, *Lakh* (?), *Okean*, *Diana*, *Zhulah* (?) have been placed under the flag of the Red Cross and will be used exclusively for that service.—*London Times*, 12/3.

GERMAN TRANSPORT "FRANKLAND" STRIKES MINE.—The German transport *Frankland* struck a mine and sank at Noorland, according to an Exchange Telegraph dispatch from Stockholm on March 24. The transport was crowded with soldiers, cannon and munitions and, according to the dispatch, the entire crew, all of the soldiers and Admiral von Meyer were lost.—*Army and Navy Journal*, 30/3.

RUSSIAN CRUISER "ADMIRAL MAKAROFF" SUNK BY MINE.—The Russian armored cruiser *Admiral Makaroff* was sunk by a mine in the harbor of Reval, in the Gulf of Finland, March 28. She was 442 feet long and displaced 7775 tons. She was armed with two 8-inch, eight 6-inch and twenty-two 3-inch guns and two torpedo tubes. Her complement was 568 men, and she was laid down in 1905. Her speed was 22 knots.—*Army and Navy Journal*, 6/4.

RUSSIANS SANK THEIR WARSHIPS IN BATTLE.—Washington.—The Russian warships sunk by their commanders off the southern coast of Finland to keep them out of the hands of the Germans, reported several days ago, were blown up after German warships had opened fire on them, according to a despatch to the State Department recently from Stockholm. Three of the Russian vessels were battleships.—*N. Y. Herald*, 8/4.

HUNS ORDER RUSSIA TO STRIP WARSHIPS.—Washington, April 11.—Germany has demanded that the Russians strip their fleet according to confidential information reaching this government recently.

The Russians have been ordered not to leave the complement of over 25 men on any vessel, and the Germans are seeing to it that some of the guns are removed so that the vessel shall be ineffective. The Government's information indicates that the Russians are not resisting the order to any extent.

The plan thus far does not show that Germany intends to absorb the Russian units, though it is believed she may attempt to get the few great powerful battle-cruisers which are still intact.—*Baltimore Sun*, 12/4.

GERMAN TRANSPORT SINKS.—March 23.—A stockholm dispatch states that another German transport has been blown up by a mine near the Aland Islands. The men were rescued by the *Frankland*, another transport which was afterward badly damaged by an explosion.—*Literary Digest*, 6/4.

40,000 HUNS LAND AT HELSINGFORS.—London.—The Germans have landed 40,000 troops at Helsingfors, according to an Exchange Telegraph despatch from Copenhagen. A German squadron anchored in the harbor of Helsingfors consists of 12 ships, including the battleships *Posen* and *Westfalen*, each of 18,600 tons.—*N. Y. Herald*, 18/4.

NO DEFINITE KNOWLEDGE OF FATE OF RUSSIAN SHIPS.—There is as yet no definite knowledge as to the exact number and classes of Russian warships that were blown up or sunk by their commanders off the southern coast of Finland to keep them out of the hands of the Germans. A dispatch of April 8 from Stockholm to the State Department at Washington, however, states that three of the Russian vessels sunk or blown up were battleships.—*Army and Navy Journal*, 13/4.

GERMAN FLEET HAS TWO NEW WAR VESSELS.—Amsterdam.—Two new dreadnoughts have been added to the German fleet during the war, according to the *Vossische Zeitung*, and have participated in the bombardment of the fortifications on the islands of Oesel and Dago. These vessels are the *Baden* and the *Bayern*, which were launched in 1915 at Kiel and Danzig. They fire 38-cm. shells.—*N. Y. Herald*, 12/4.

BERLIN DENIES WARSHIP LOSS.—Amsterdam, April 13.—The German battleship *Rheinland*, which was reported to have struck a mine and sunk, has not gone down, according to a Berlin dispatch. She is said to have stranded near the Aland Islands in the Baltic, in a fog on Wednesday, and efforts are being made to refloat her.—*Sun, Balto.*, 14/4.

GERMAN BATTLESHIP TAKEN OFF SHOALS.—London.—A Reuter despatch from Stockholm says that the German battleship *Rheinland*, which was reported stranded near the Aland Islands, has been refloated. The battleship is badly damaged.—*N. Y. Herald*, 15/4.

BRITISH SINK TEN GERMAN TRAWLERS IN THE CATTEGAT.—London.—Ten German trawlers have been sunk by gun-fire in the Cattegat (between Sweden and Denmark), the Admiralty announces. Their crews were saved by British ships. There were no British casualties.

The operations in the Cattegat, the statement says, were undertaken by the commander-in-chief of the Grand Fleet.

The statement follows:

"The commander-in-chief of the Grand Fleet reports having undertaken to sweep the Cattegat on April 15. Ten German trawlers were sunk by gunfire, their crews being saved by British ships. There were no British casualties."—*N. Y. Herald*, 17/4.

GERMANS TO FIGHT RUSSIAN WARSHIPS.—London, April 16 (British Admiralty per Wireless Press).—Dr. Richard von Kuehlmann, the German Foreign Minister, has telegraphed to M. Tchitcherin, the Bolshevik Foreign Minister, to the effect that the Russian Black Sea fleet has separated into sections of unknown nationality, and, in violation of the peace treaty providing for the disarmament of Russian warships, is attacking allies of Germany.

Dr. von Kuehlmann gives notice that all Black Sea warships continuing to act in violation of the Brest-Litovsk treaty will after April 20 be treated as hostile ships.—*Baltimore News*, 17/4.

MEDITERRANEAN

SINK AUSTRIAN BOATS.—Rome, April 9.—An official statement issued to-day by the Italian War Department says:

"In the Asiago Basin our counter-battery shots caused explosions and fires within the hostile lines.

"Opposite Fagare enemy boats were sunk by our artillery fire. Between Salgareda and Zenson we retaliated vigorously against a lively rifle fire of the enemy.

"On the rest of the front there was no event of importance.

"An enemy machine was shot down by one of our aviators above Luce di Piave."—*N. Y. Times*, 10/4.

GUN CREW ABOARD ITALIAN STEAMSHIP DESTROYED U-BOAT.—Men of the gun crew on board an Italian steamship arriving yesterday at an Atlantic port carried silver medals presented them for good marksmanship when they sank a hostile submarine in the Mediterranean on March 12.

With the arrival yesterday of the steamship the first news of the fight with the submarine was brought to this side of the Atlantic. Officers and passengers said the vessel was only a few miles east of Gibraltar during her eastward voyage when the submarine loomed up off the starboard. The undersea boat sent a torpedo after the steamship, but the latter turned quickly and the missile missed its mark. Another was launched, but that also was dodged successfully.

The attacked, which either was German or Austrian, arose and a gun crew popped from her conning-tower. A shell was fired by the prowler, but it went wild. As it passed over the bridge of the steamship the gunners on board the Italian vessel let go their shots. One of these struck the conning-tower of the submarine, and she went down like a huge mass of lead.

It was the belief of those on board that the submarine was one of several having a base off the Spanish coast. They said many submarines are in the Mediterranean.

Mrs. H. C. Dreyfuss, wife of the American Consul at Malaga, Spain, was one of the 61 passengers on board. She said that on a recent visit to Turkey she had learned there are strict regulations regarding movements of all nationals of countries at war with that ally of Germany.—*N. Y. Herald*, 2/4.

BLACK SEA

GERMANS OCCUPY NICOLAIEFF.—Petrograd, March 17.—Telegrams received here state that Odessa and Nicolaieff were taken without resistance. The Russian fleet, which was in the harbor of Odessa, withdrew to Sebastopol. In both Odessa and Nicolaieff the Germans immediately suppressed the Soviets and at Nicolaieff seized the naval dockyards.

The German offensive is taking the direction of Kherson (east of Nicolaieff).

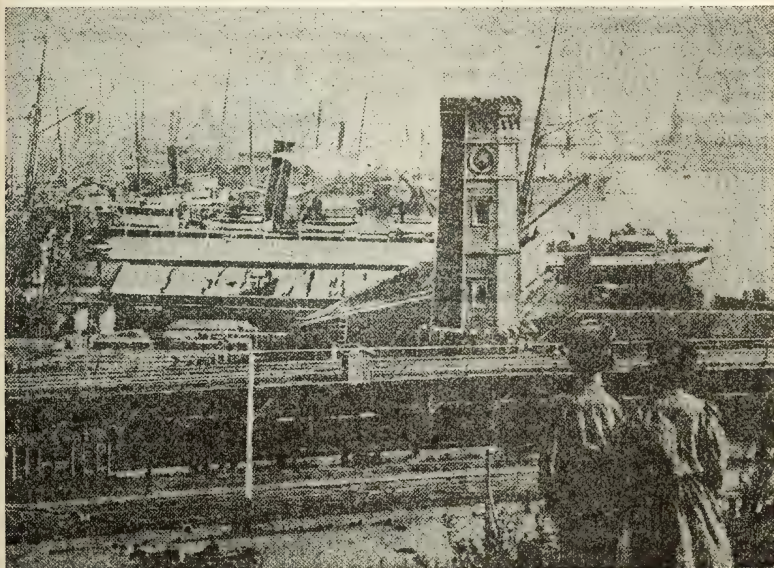
The first through train from Berlin arrived yesterday at Narva.—*Reuter*. Nicolaieff is northeast of Odessa on the estuary of the Bug. It has a population of 106,000.—*London Times*, 18/3.

ODESSA RECAPTURED.—*Bolshevist Claims in South*.—Moscow, March 26.—The Official Telegraph Agency announces the recapture of Odessa by loyal Soviet and Ukrainian troops after a bloody fight. The naval forces also co-operated successfully in the battle.

The capture of Nikolaieff, Kherson and Odessa has greatly strengthened the position of the Soviet forces.—*Reuter*.

Petrograd, March 25.—The Black Sea fleet is reported to have bombarded Sukhum Kale, a considerable port on the east coast of the Black Sea, north of Batum.—*London Times*, 28/3.

THE PORT OF ODESSA.—Odessa is one of the most important seaports of Russia, as regards population and foreign trade. It was founded by Catherine II in 1792, soon after the extension of the Russian dominion to the shores of the Black Sea. This city is situated on the southern shore of a semi-circular bay, at the northwest angle of the Black Sea, about 400 miles northeast of Constantinople, and is the seaport for the basin of two great Russian rivers, the Dneiper and the Dneister. It is situated half way between the two estuaries. The Bay of Odessa, which has an area of 14



VIEW OF THE HARBOR OF ODESSA.

square miles and a depth of 30 feet, with a soft bottom, is a dangerous anchorage on account of its exposure to easterly winds. Inside it are six harbors, divided by moles, namely the quarantine harbor, the new harbor, the coal harbor, and the practical harbor. In addition there are the harbors of the Russian Company for Navigation and Commerce, and the petroleum harbor. The harbors freeze for a few days in winter, navigation being interrupted every year for an average of 16 days.

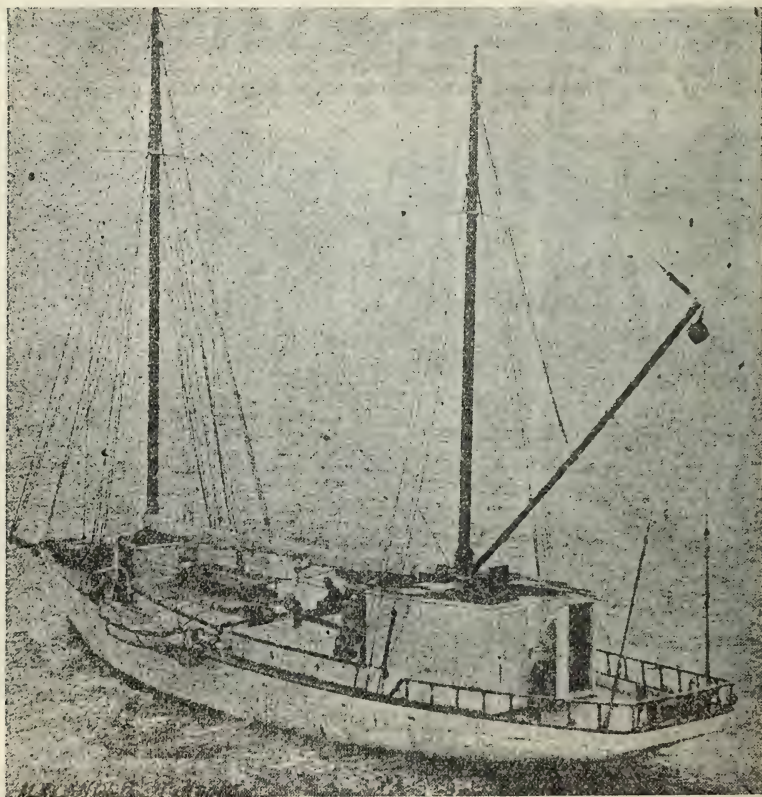
The city is built on a terrace 100 to 150 feet in height, which descends by steep crags to the sea.—*Nautical Gazette*, 11/4.

PACIFIC AND INDIAN OCEANS

SUPPOSED GERMAN COMMERCE RAIDER CAPTURED IN PACIFIC.—A fast motor-driven craft, 60 feet long and having twin screws, believed to be a German commerce raider, has been captured in the Pacific and is being

towed to a Pacific port by a United States cruiser, according to an announcement by the Navy Department to-night.

The government possesses information that the boat, the *Alexander Agassiz*, was outwitted in a port on the west coast of Mexico, where she was completely equipped by a German crew and guns. Before being captured the *Agassiz* was seen to drop heavy objects overboard, which might have been mounted guns of heavy enough caliber to sink American merchant vessels. When overhauled she had German flags, rifles and pistols.



"ALEXANDER AGASSIZ."

As the supposed raider carried no ship's papers she apparently was permitted to clear against law, and that matter is likely to be taken up with the Mexican Government. The incident has revived rumors that Germans have been permitted to use Mexican ports, both on the Gulf and the Pacific. The Navy Department's announcement follows:

"The Navy Department announced that a small American vessel, the *Agassiz*, which sailed from a West Mexican port, where she had been fitted out under circumstances which led the naval authorities to believe she might be used as an enemy raider, has been seized at sea and taken to a Pacific port for investigation. There were found aboard several Germans,

German flags, rifles and pistols. When seized she had no ship's papers, and a number of articles were seen to be thrown overboard.

"The *Agassiz* is a gas-propelled boat about 60 feet long, and so far as present information indicates carried no mounted guns."

Other advices from the Pacific coast indicate that the *Agassiz* was captured off the Mexican port of Mazatlan last Tuesday and that she will reach an American port on the Pacific in the near future. She formerly was owned and used by the University of California in biological research work. A year ago in January she was sold to the Pacific Trading Company, and since then she has been a source of considerable worry to the government.

She had been under suspicion and had been watched at a Mexican port. The captain of the cruiser making the capture has sent a wireless message that the *Agassiz* carried an all German crew and was outfitted as a commerce raider.—*Evening Star*, 23/3.

"AGASSIZ" TAKEN TO PACIFIC PORT FOR INVESTIGATION.—The Navy Department is advised that a small American vessel, the *Agassiz*, which sailed from a West Mexican port, where she had been fitted out under circumstances which led the naval authorities to believe that she might be used as an enemy raider, has been seized at sea and taken to a Pacific port for investigation.—*Army and Navy Journal*, 30/3.

DUTCH SUBMARINE CAPTURED BY INTERNED GERMAN SAILORS.—A submarine of the Dutch Navy was captured at Batavia by sailors from the interned German steamer *Graf von Luttwitz*, who succeeded in evading the marine patrol and putting to sea with their prize last January, according to Fritz von Ebelsohn, an employee of the Dutch East Indian Government in Sumatra, who was in San Francisco on March 19 on the way to Holland. "This submarine was sent out by the Royal Government for patrol duty in East Indian waters," said von Ebelsohn. "One night, during the absence of the crew at a reception tendered them by colonists, when only an anchor watch was left aboard the submarine, sailors from the interned German merchant steamer *Graf von Luttwitz* rowed alongside, boarded the submarine and, after a fight in which a Dutch guard was killed, took possession of the vessel. When the loss of the submarine was learned two Dutch cruisers, as well as several allied vessels, started in pursuit, but whether the submarine was recaptured we never learned."—*Army and Navy Journal*, 23/3.

GERMAN MINE FIELDS OFF AUSTRALIA.—Australia is greatly excited over an extensive mine field just discovered off the coast of New South Wales. There is a great deal of speculation as to the circumstances under which the field was planted. One of the officers of the vessel which discovered the field said that the mines were the latest and most powerful Germany was known to possess. They were oval shaped, measuring 4.6 feet long, by 2.7 feet wide, and constructed of ¼-inch steel. Weighing about 200 pounds, they were filled with T. N. T., one of the most powerful explosives made. "These mines," the officer went on, "were laid out in a proper and scientific mine field, extending for about five miles. They were situated right on the direct route for vessels in that vicinity. They were probably laid by "neutral" vessels as in the case of those off the Cape of Good Hope, which have already destroyed several vessels."—*Nautical Gazette*, 4/4.

BRITISH SAILORS FIRED ON.—Shanghai.—The *China Press* learns from Hankow that the British gunboats *Woodcock* and *Kinsha*, with British Consular officials on board, have gone up the Yangtze to arrange with the Southerners to cease firing on steamers. The Japanese gunboat *Fushimi*, proceeding ahead, was heavily fired on above Sinti, and returned fire. The

Woodcock and the *Kinsha* remained at Sinti, and sent a party to negotiate, which was fired on and forced to return.

The members of the party report that it is impossible to come to an understanding, and that the Upper Yangtze is hopelessly closed.—*Reuter*.—*London Times*, 4/3.

ALLIES ON THE YANGTZE.—Shanghai.—The Hankow correspondent of the *China Press* states that the British gunboats *Kinsha* and *Woodcock*, the United States gunboats *Quiros*, *Samar*, and *Monocacy*, and the Japanese gunboat *Fushimi*, escorting four river steamers, proceeded up the river recently with the object of making an attempt to open up the Upper Yangtze.—*Reuter*.

The Yangtze is roughly the dividing line between the north and the south, and since the revolt of the south last year the Upper Yangtze has been closed, as the southerners fire on steamers that attempt to pass. In December last a steamer of the Asiatic Petroleum Company was heavily fired on and the captain was killed. A gunboat was also attacked. In these cases, however, the offenders were apparently northerners. In an earlier attack, on the United States gunboat *Monocacy*, one man was killed and two were wounded by southerners. Last month the British and Japanese gunboats named in the above telegram, with British consular officials, went up the river to try to arrange with the southerners to cease firing on steamers. The *Fushimi* was fired on above Sinti. The British boats remained at Sinti and sent a party to negotiate, but it also was fired on and forced to return.—*London Times*, 19/3.

ALLIES LAND MARINES AT VLADIVOSTOK.—*Landed to Protect Japs*.—Tokyo.—Japanese marines landed in Vladivostok at dawn April 5 for the protection of Japanese residents, following an attack on a Japanese shop the previous day, it was officially announced to-day. One Japanese was killed in the attack and there were other casualties.

Disorder reigns in Vladivostok, it was said. The police force is under absolute control of the Bolshevik Soviet.—*Baltimore Sun*, 12/4.

JAPANESE MARINES GUARD FOREIGNERS.—Tokyo.—Special despatches received here to-day from Vladivostok say that the proclamation issued by Admiral Sadakichi Kato, member of the Japanese Admiralty Council, giving reasons for the landing of Japanese, created a good impression among the Russians. Japanese marines are guarding the foreign settlements. An armed guard of 300 Japanese volunteers are policing the Japanese quarters.

It is understood in Tokyo that the landing at Vladivostok was made after a consultation with the foreign consuls there. Japanese officials are quoted in the newspapers as saying that the marines will be withdrawn as soon as order has been restored.—*N. Y. Herald*, 12/4.

BRITISH LANDED TO PROTECT RAILROAD.—London.—The landing of British marines at Vladivostok was principally to protect the railway station and the vicinity of the British consulate, according to a Reuter despatch from Tokyo.—*N. Y. Herald*, 8/4.

MAY BE WAR WITH JAPS.—Moscow.—Nikolai Lenine, the Bolshevik premier, in a speech here said that possibly Russia would have to declare war on Japan in connection with the landing of Japanese troops at Vladivostok.—*Baltimore Sun*, 10/4.

GERMAN PRISONERS MOBILIZED.—London.—While the Russian Bolshevik authorities deny it, says a dispatch from Harbin by way of Tokyo to the *Daily Mail*, there are 60,000 armed German prisoners mobilized at Toms, Siberia, and destined for the Far East.—*Baltimore Sun*, 10/4.

AMERICANS LANDED TOO.—Harbin, April 5.—American marines have been landed at Vladivostok, as well as British and Japanese forces, according to advices from that place. The Americans are in control of the docks, while the Japanese are guarding the railway and ammunition depots.

Refugees reaching Harbin from Blagovieshtchensk give details of recent disorders in that city. The trouble arose as a result of an attempt by the Bolsheviks to disarm the Japanese, who had armed for self-defence. During the first day of the trouble, General Koshevnikoff, commanding a few Cossacks, aided the Japanese and repulsed the Bolsheviks, but the latter, reinforced by Red Guards, overcame the defenders of the city. Several buildings were looted and burned, including the leading stores, after which the others were sealed and proclaimed community property.

Armed farmers, hearing of the situation, came into the city and forced the Red Guards to yield. A second orgy of pillaging ensued. General Koshevnikoff lost 100 men killed, including eight Japanese and two Chinese. Between 200 and 300 noncombatants are reported to have been slain. The refugees secured 8,000,000 rubles of the Imperial Bank funds, which they are bringing to Harbin.—*Baltimore Sun*, 10/4.

SHOULD REASSURE RUSSIA.—Washington.—Landing of American marines at Vladivostok is expected to have a reassuring effect in Russia. With Americans joining the British and Japanese naval forces in protecting life and the vast stores of war material belonging to the Allies at the Siberian port, the enterprise is given a distinctly international character, which, it is believed here, should quiet fears of the Russians aroused by German suggestions that a Japanese invasion has begun.

Since the attitude of the United States is credited with having stayed the proposal for real Japanese intervention in Siberia to check German influence, participation by Americans is counted upon to emphasize the purely local character of an operation undertaken to protect life and property where there is no competent Russian authority to enforce order.—*Baltimore Sun*, 12/4.

LAND MARINES AT VLADIVOSTOK.—Washington.—Both the State and Navy Departments anticipated that they would be advised as to the reported landing of American marines at Vladivostok.

It has been known for some time—though confidentially—that the United States was represented in the squadron lying off the Siberian port, but officials suggested Americans would not land there unless American lives, as well as property, were endangered.

It is anticipated that the reported American action will be seized upon by Lenine and his pro-German agents to inflame the Russian people. This will be offset, however, by an American statement as to necessity for the action. Anarchy has been rife at Vladivostok, and it is assumed that Americans would join the Japanese and British only in case of extreme necessity.

The reported landing does not mean that this country has changed her policy toward the recently proposed Japanese intervention in Siberia, it was stated officially. It was said that if the marines were landed they were put ashore merely to protect American lives and property and not to interfere with the political situation.—*Baltimore Star*, 12/4.

NO ALLIED ACTION AT VLADIVOSTOK, SAYS MR. FRANCIS.—Washington, D. C.—In giving out recently the text of a statement made at Vologda by Ambassador Francis, the State Department made it clear that the landing of Japanese and British forces at Vladivostok was not in pursuance of any international agreement, but merely was to protect Japanese and British interests.

The Ambassador's statement, which was issued on April 10, said that no Americans had been landed. It was given out by the State Department

in denial of reports that Mr. Francis had declared the incident was due to an agreement.

Despatches to the Navy Department to-day from Rear Admiral Knight, commander of the American Asiatic fleet and to the State Department from consular representatives, made no mention of American forces having been landed and officials now are convinced that the report from Harbin of a landing was started by refugees from Vladivostok who perhaps saw a party of American marines on shore leave or a quartermaster's corps detachment ashore.

The statement by Mr. Francis as given out by the State Department reads:

"The American Ambassador, upon being asked what was the position of his government concerning the landing of Japanese and British marines at Vladivostok, said:

"The Soviet government and the Soviet press are giving too much importance to the landing of these marines which have no political significance but merely was a police precaution taken by the Japanese admiral on his own responsibility for the protection of Japanese life and property in Vladivostok, and the Japanese admiral, Kato, so informed the American admiral, Knight, and the American consul, Caldwell, in Vladivostok. My impression is that the landing of the British marines was pursuant to the request of the British consul for the protection of the British consulate and British subjects in Vladivostok, which he anticipated would possibly be jeopardized by the unrest which might result from the Japanese landing.

"The American consul did not ask protection from the American cruiser in Vladivostok harbor and consequently no American marines were landed; this, together with the fact that the French consul at Vladivostok made no request for protection from the British, American or Japanese cruisers in the harbor, unquestionably demonstrates that the landing of allied troops is not a concerted action between the Allies.'"—*N. Y. Herald*, 17/4.

GENERAL NOTES

THE RUSSIAN FLEET.—While it is beyond a doubt that on the outbreak of the Revolution in Russia, a number of naval officers were done to death in the most cruel manner, it may be hoped that some of the reports of what happened in the Black Sea more recently have been exaggerated. A correspondent of the *Observer* who was recently in Russia says in reference to the Baltic fleet that the overthrow of Kerensky's government by the Bolsheviks incidentally saved some of the officers from destruction, because a telegram was received at Helsingfors from the new men in power ordering that no further lives were to be sacrificed. According to another correspondent a series of murders were committed in the Black Sea fleet by agents of Germany. Out of some 500 officers arrested, 80 were killed, many of them being beaten to death, while others were shot on board their ships and their bodies thrown overboard. The officers against whom particular animosity was directed, it is said, were those in command of destroyers who had been specially active in the destruction of Turkish shipping. It is conceivable, however, that Germany is anxious to obtain the Russian destroyers in the Black Sea for future use, and may have assisted to remove those whose patriotism would inspire them to render their vessels ineffective before they fell into the hands of the enemy.—*Army and Navy Gazette*, 30/3.

THE SUBMARINE CAMPAIGN.—By Arthur Pollen.—The coincidence last week of the revelation by the government of the true position with regard to tonnage—incidentally, a bird's-eye review of the course of the war at sea during the last year—with the great attack on our front in France, intended by the Germans to be decisive, has proved, as nothing else could have proved, that the strategy of our enemy is entirely dominated by the course of the war at sea. Two other events—the destroyer engagement that

took place last Thursday between Dunkirk and Zeebrugge, and the seizure of Dutch shipping—interpreted, as they should be, in the light thrown upon the sea war by the Admiralty revelations, emphasize this broad truth still further. The Dunkirk engagement serves further to indicate to us certain essential truths governing the present sea war, which seem to have been little appreciated during the last three years. Let us deal with these points in order.

Tonnage of the World.—Sir Eric Geddes gave us the broad facts of the tonnage position in his statement read to the House of Commons on Wednesday. On Thursday evening a White Paper was issued setting out, graph-wise, the loss of tonnage and its replacement by new construction since the outbreak of war. Two diagrams were published, one showing losses and reconstruction as they affected British shipping only, the other illustrating the same for all neutral and all belligerents other than the enemy. If we regard, as scientifically, I suppose, we should, the world's tonnage, so defined, as under allied control and equally available for allied purposes, then the situation revealed by the second diagram, while anything but satisfactory to those who hope for a speedy victory by America's military help, is very much less alarming than those anticipated who have interpreted the food rationing to foreshadow an impending surrender by famine, although of course, we have paid and must continue to pay until the end of the war the penalty for this serious loss of tonnage.

The situation is, roughly, this. Over 11,800,000 tons have been lost. The British share is just over 7,000,000; the non-British share just under 5,000,000. Of this loss just over six and a half million tons have been replaced by new construction, and just over two and a half millions by the seizure of enemy vessels. British new construction amounts to just over three million tons, and the tonnage we have captured to just under eight hundred thousand, so that our total loss of seven million tons is diminished by the total gain of 3,800,000, leaving us with a net loss of just over three and a quarter million. The non-British powers have constructed half a million more tons than we have, and have captured a million tons more. Their gross gain is therefore, nearly 5,400,000 tons, and as their loss was only 4,750,000 they have a net gain of over 600,000 tons. Setting this off against the net British loss, the Allied Powers and neutrals together are just over two and a half million tons to the bad.

This was the position at the end of last year, and in the last quarter of last year the rate of loss was diminishing very rapidly indeed. It had fallen—since the third quarter—from about a million and a half tons to about a million and a quarter, while new construction had gone up from 600,000 to nearly 950,000 tons. The two curves as published, look as if they were going to meet before the first quarter of this year was completed—as if, in other words, they should have met already. The curves, as published for Great Britain, showed a similar tendency. At the end of the third quarter of 1917, our loss of tonnage was at the rate of 950,000 and our construction 250,000 tons. There was a gap, therefore, of 700,000 tons. But by the end of the year, the rate of loss had fallen below 800,000 tons, and the rate of construction had risen to over 400,000. So, where the graphs end, the gap was below, being but little more than 350,000 tons. Could the curves have continued, these two also would have met by about the end of this month. As I shall point out later, through the accidental selection of quarterly periods, both of these curves are misleading.

But before going on to this demonstration, let us deal with the actual situation at the close of last year. The tonnage available to the Allies, as we have seen, was then, roughly, two and a half million tons down. This in itself does not reveal a position that is dangerous. If new construction were never to rise beyond the level at which it stood at the close of 1917—just under a million tons a quarter—and if there was no improvement in the rate of loss—just under 1,300,000 tons a quarter—it is certain that the enemy would not be able, by such an attrition of our sea transport as this, to bring

the allied combination to the negotiation point—which is the same thing as surrender point—before exhaustion had overwhelmed the Central Powers themselves. The curves, in other words, show at the final point to which they have been carried, that if they continued parallel to each other from now onwards, the sea strategy embarked upon by Germany fourteen months ago at the cost of bringing the United States into the war has already been proved to be a failure.

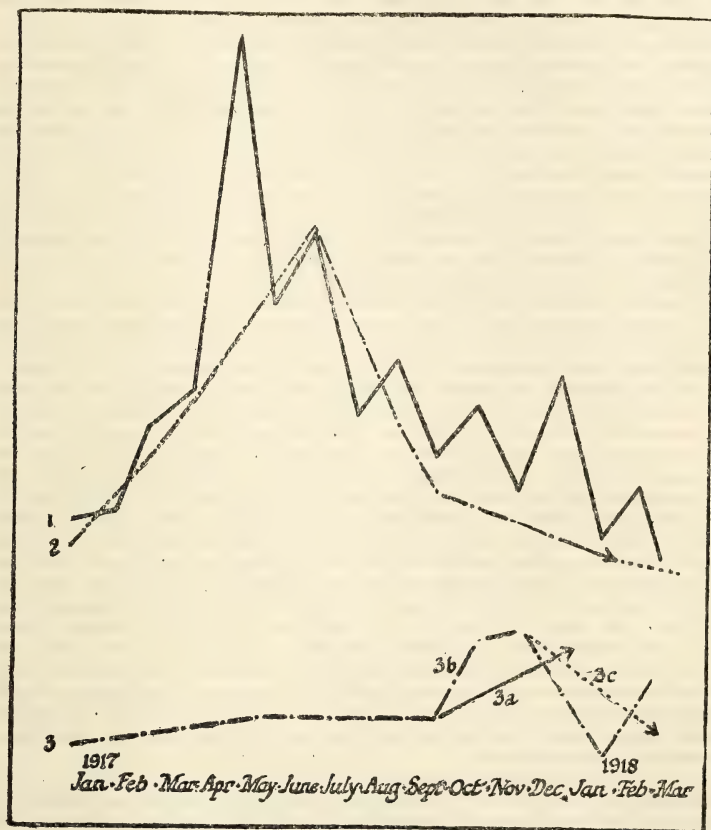
Failure of German Sea Strategy.—The best proof that this is the moral of these curves is that the Germans are concentrating the whole of their forces in an attack upon the British lines to-day. They would not do this if victory were attainable by other means. We have only to look at the situation 15 months ago to realize this. Germany had then just called upon the Allies to make peace or take the consequences. The consequences to England, if she declined to treat on the basis of the war map, were to be, as was pointed out in these columns at the time, the ruthless destruction of her shipping. This menacing irenicon was followed by a step not less significant by President Wilson. This while seemingly an effort at peace was really, as again was pointed out in these columns, only the final preliminary to preparing America for war. He asked, it will be remembered, that both belligerents should state their war aims, under the plea that they might not be found too divergent for accommodation. The pretext was, of course, the merest camouflage. All the world knew that the German war aims could not be stated—and no one knew it better than the Germans. From the moment President Wilson's note was published, the decision of Germany became inevitable. There was literally no alternative to the ruthless submarine war—though such a war would throw America on to the side of the Allies. The elements in Germany that, quite rightly, judged that if the submarine failed American intervention would be Germany's final ruin, implored Bethmann-Hollweg, who was still chancellor, to reconsider this policy. He refused on the ground that the submarines must succeed in a reasonable number of weeks. We had then in the chancellor's statement a measure of the German hope, even if we had not the further measure that it was worth American belligerency. Had it succeeded, of course—and we have only to look at the curve from February to April to see how near it came to success—there would have been no need for further fighting on the Western front. The Allies simply could not have continued the war. But in April the navy began to get the better of the submarine, and has continued not only successfully, but with increasing effect, to defeat it.

If the net rate of loss to-day was likely to remain permanent it still would not be achieving for Germany what Germany hoped to achieve when the campaign began. It is this failure that has made the vast effort on land imperative, and the effort has to be on this colossal scale because to Germany there is no alternative between complete victory and abject defeat. The collapse of Russia, it is true, puts Germany in a very different position to-day in making a bid for complete victory on land than was hers a year ago. But the broad fact remains that a land victory, while to the last degree improbable, is only possible at enormous cost, whereas a sea victory by submarine, which seemed far from improbable, would have been both cheap and rapid.

Will the Situation Improve?—It is important to seize this fact, of the December position being a proof of German failure, as the starting-point of a further consideration of the problem, because it is even more certain that the curve showing the rate of loss must continue its downward slope. It is, as plainly, a mere matter of statesmanship evoking the right *moral*, and of sound business management producing the right organization, for the replacement curve to rise far more steeply in 1918 than in fact it rose in the last quarter of the preceding year. Why, it may be asked, is it possible to speak so confidently on these two points?

The answers to these questions are not very recondite, and to make them more intelligible, I have ventured to redraft the Admiralty curves. I have

supplemented that illustrating British tonnage losses (2) by another (1) showing the monthly shipping losses. And I have varied the monthly British replacement curve (3) by branching off at the month of October with, first, a new curve showing the monthly rate of replacement—which is the curve (3B). Secondly, as a contrast to the Admiralty's curve for the last quarter of last year—marked (3A) in my diagram—I have added a new quarterly curve (3C) for the three months, December, January, and February. This curve shows that the chance selection of the three months October, November, and December give, as a matter of fact, a



totally false view of the situation. If we regard the two curves, the loss curve as showing the work of the navy, and the replacement curve as showing that of the civilians, the course of the campaign is revealed to us almost at a glance. Where the White Paper curve misleads is that it understates the initial naval failure, by smoothing the curve for the three months April, May, and June. It understates, therefore, the really extraordinary character of the purely naval recovery of the position. To realize this we should not only contrast the mean between the rate of loss in the third quarter of the year and the rate of loss at the finish, but the rate at its highest point in April, and its lowest point in the second week of March this year.

And, just as the recovery of the navy is understated, so the civilian effort is, quite unintentionally, flattered.

The published curve gives a picture of the civilians about to join hands with the navy early in 1918. But if we take the quarter which I have selected, we see that, so far from the civilians rising to meet the sailors, they are indeed in full retreat from the enemy and retiring ignominiously from the struggle. The curves, instead of converging, are not even parallel. The shipbuilders are not contented to let the navy improve and only fall off in the same degree that the navy does improve. They have done worse; they are falling back on one flank faster than their allies are advancing on the other, so that the curves, instead of converging or becoming even parallel, are actually getting wider apart. The Admiralty, of course, so far from having the slightest intention of veiling this unpleasant fact, take very great pains in the White Paper to warn the public against being deceived. For we are specially cautioned that production has fallen so far below the rate exhibited in the graph that "if some improvement is not speedily made, the point where production balances losses will be dangerously postponed." I venture to think that, had the curves been continued as they might well have been, to the end of February, the graphic index to the position would have made any verbal caution unnecessary, and would amply have accounted for so drastic a step as the creation of a new dictator of shipbuilding and the appointment of so eminent a master of the business as Lord Pirrie to the new office.

Bad as this situation is, it is admittedly one that can be retrieved. The First Lord evidently expects it will be retrieved. But there is no immediate prospect of our seeing, in the British curve, so sharp an upward slope as the published diagram gives. For the maximum output for this year is put at 1,800,000 tons—a mean rate of 165,000 tons a month for the next ten months, while it is only by the beginning of next year that we hope to show a monthly output of a quarter of a million tons—assumed to be this country's maximum possibility of production. If, then, the two lines are to cross, the rate of loss reduced to zero, and a definite increase in the world's shipping to be brought about, we must rely upon two other elements in the problem. First, we must look to the navy to cause a still greater decline in sinkings, and, next, to our allies and to the neutrals to quicken their shipbuilding. Now, as to the last, there is every reason to believe that the United States should come very near producing four million tons this year. If another million can be got from other sources, this output, combined with our own, will give a mean rate for the year of 500,000 tons a month, and would beat the present loss curve so greatly as to show a net gain of nearly a million and quarter tons a quarter. At this rate, the world's net losses—even if they continued for some months longer—should be caught up before we are far advanced in 1919. All this, of course, depends upon the shipbuilding effort here and abroad realizing the hopes of those who are organizing it.

We are left, then, with the final question whether the rate of loss cannot be diminished. On this point the Admiralty, very prudently, declines to prophesy. But less responsible people may without undue rashness indicate their grounds for being optimistic. They are, roughly, two. If we look at the monthly rate of loss in April and contrast it with that at the present time, we shall notice that the gap between the highest and the lowest point is enormous. Now, the naval effort which has accomplished this is marked by two characteristics. For want of a better term, it can be described first of all as almost mainly defensive. It has consisted, that is to say, chiefly in concentrating shipping into convoys, and then guarding those convoys by armed ships, so that a submarine desiring to carry out its mission must generally take the risk of encountering armed force superior to itself before it can do so. We had, in other words, finally, and after much hesitation, adopted in the latter half of last year the simple principle of naval strategy which had governed us in all previous sea wars when a simi-

lar difficulty had to be met. We interposed superior force between the enemy and its objective. I have called this policy "defensive" in full realization that the term is misleading, because in the actual event it is the offensive which is taken against the submarine. But the initiative is really left with the submarine. If, when it comes to the point, the Hun pirate does not like the look of things, he will have to let the convoy go by rather than risk an encounter with its protecting ships. The destruction of the enemy's submarines—which we gather from official statements to be at the rate of about twelve a month—is, then, only incidental to the general course of our campaign.

We have not, in the period under review, been able to carry our direct offensive against the submarines very far. The White Paper makes this clear: the reduction in the sinkings "has been achieved in spite of imperfect knowledge of a new and barbarous method of warfare, and of a scarcity of suitable material. Our material resources for this warfare are already improved, and are being rapidly augmented, while science is placing at our disposal means of offence and defence of which we have been in need." The progress made since April, in other words, is not due to any sudden accession of material—always accepting the very welcome assistance that Admiral Sims' destroyers brought at this critical moment—but to the adoption of sound methods of using the material available; to the reorganization of the higher command brought about last May; to the consequential adoption to the convoy system; to a more scientific adaptation of available means to the end in view; to a wiser selection of men; and, generally, to a closer co-operation between all the agencies that could contribute to the desired result. But on the direct offensive against the submarine only the beginnings could be made. How these have progressed since we have to gather from faint indications. I shall touch on these in dealing with the Dunkirk argument. For the moment, let us note that the navy's strongest card has not yet been played.

The second reason for expecting improved naval results is that the defensive organization that has revolutionized the situation since last spring has not yet been applied in the Mediterranean where, the First Lord told us, a third of our losses are being incurred. It has been stated by some who claim to know that our tonnage losses in the Mediterranean are relatively heavier than elsewhere. If Admiral Calthorpe can get his forces to work as satisfactorily as the British and American forces in the Atlantic there should soon be a very material improvement in this very important field.

Lastly, we surely cannot be deceiving ourselves in supposing that the pirates themselves must now be going at their work with greatly diminished belief in its efficiency. Their losses are heavy; their condemnation by the whole world is known to them; their victims are a diminishing number; they must be conscious that this combination of guilt, suffering and failure has not gained, and now has no prospect of gaining, that result for their country that would have led to their being forgotten.

Now, if we put these elements together: (1) the admitted capacity of British, American, and the allied and neutral shipbuilding yards to reach a production of six million tons in the course of this year; and (2) the high probability of the naval effort continuing increasingly successful on its present lines; and (3) having in reserve a stroke which may be far more successful than anything it has yet done—we must, it seems to me, be blind indeed if we do not perceive that the whole position has been reversed since April of last year. It is a result which justifies those who insisted upon the reorganization of our chief command long before things reached their worst. And it is one that reflects infinite credit upon all who, at the Admiralty and at sea, have contributed to making the reforms of last May a reality. And special credit must be given to the present First Lord who, coming to the Admiralty when things were at their worst—when, as Sir Edward Carson told us, the situation seemed perfectly hopeless—has

patiently and with infinite labor first simplified and quickened the supply of material to the navy and—a far greater achievement—has now not only reorganized the fighting side of the Admiralty to fit it to direct the navy's main work, but has gone so far in finding the right men to work the machine that he has created.

The Channel Raid.—At five o'clock on Thursday morning last week, a flotilla of German destroyers, taking advantage of a haze, stole across to Dunkirk from Zeebrugge and bombarded the place for some ten minutes. They were, however, intercepted by some French and English destroyers and a runaway action ensued. At the time of writing no further details are known except that no French or British boat was sunk, and only one British boat injured; that prisoners have been brought in; that it was believed that four of the enemy had been sent to the bottom; and that its navy admits the loss of two. No doubt much fuller details will be in the hands of my readers by the time this paper is printed. In the meantime, it is clear that a very welcome success has been won by the forces under Vice Admiral Roger Keyes' command. A score, standing for the last month against the enemy, has been wiped out. But the incident means more than an agreeable reversal of fortune.

When, two months ago, the change at Dover was announced, it was suggested in these columns that if our forces at this main point of the Narrow Seas were rightly handled, it would prove a very serious matter for the enemy. In introducing the estimates, the First Lord gave us a more precise indication of the form this pressure would take. For a very considerable period the Germans have been using the Channel freely as a thoroughfare by which to get their submarines to their hunting grounds. But the new tactics at Dover have included the extraordinary bold proceeding of illuminating the entire fairway, so as to make an undetected surface passage impossible. The raid of a month ago was carried out to drive off the trawlers and drifters that carried the flares necessary for the illumination. By some oversight they were able to carry out this raid with impunity. But it may be observed that the action of Thursday morning has not arisen out of any attempt to repeat it. The real interest, then, of this incident lies in this: that once the enemy is cut off from one form of sea activity—viz., by the denial of the shortest road to his submarines—he is at once driven to some other, in this case a repetition off Dunkirk of one of the fugitive raids which he has so often attempted before.

If the Channel is effectively closed, the enemy, to get to his hunting grounds, must go north about; and from Heligoland to the western end of the Atlantic lines by this route is between 700 and 800 miles longer than by the Channel. Double this distance—for the submarine always leaves in hopes of coming home again—and you have the pirate's cruising radius, once he is at work, reduced by no less than 1500 miles more not only of destroyer and patrol peril, but a marine risk as well.

A second reflection that this last engagement off Dunkirk suggests is this:

From Dover to Zeebrugge is just over 70 miles; and Dunkirk is just over 35 from each point. Seventy miles is, if I remember right, almost exactly the distance from Port Arthur to the Elliott Islands, which the Japanese seized and used as a base for operations against the Russian Fleet in that harbor. These new activities at Dover tempt one to speculate on the course the naval war might have taken had it been possible for us to have seized and defended a considerable anchorage within, say, a hundred miles of the mouth of the Elbe. The Germans have often complained of the disadvantage their navy was at owing to their geographical position. But it is not at all certain that the disadvantage has been all on one side. Unquestionably, that our main sea bases were five or six hundred miles from the main German base has given a character to the war that it could not possibly have possessed had we been situated as were the Japanese in their war with Russia. And it is a character entirely unfavorable to the stronger and more enterprising side. The topic is a large one, and I do

not propose to pursue it at length now. I mention it only to draw attention to the fact that we shall probably witness in the case of Dover and Zeebrugge the development of a campaign from which perhaps a "might-have-been" may be reconstructed by the ingenious. In the meantime, we have heard nothing more of the inquiry into the loss of the drifters a month ago. But it is evident that the lessons of that event have not been ignored.—*Land and Water*, 28/3.

SEVENTEEN SUBMARINE SAILORS BURIED IN BRITISH SOIL.—*Story Just Published of Mine-Layer Running Afoul of Bomb It Had Placed*.—London, March 5.—In a small seacoast village cemetery within a day's travel of London, there are 17 graves, side by side, where British sailors some time ago buried 17 German sailors—all but one of a crew of a U-boat which was sunk by one of its own mines just outside the village. Publication of the story, without mention of place, names and some other details, is now permitted.

The populace of the village was awakened at 10.30 one night by a terrific explosion on the water front, followed a few moments later by a second explosion. The villagers ran down to the beach, but the lifeboat could not be used because there was no one on hand who could run the engine. The old oared lifeboats were dragged from storage in a nearby shed and manned by boys and old men.

Nothing to Guide Rescue Party.—No ship was in sight, nor was there any further sound to guide the rescue party. Nevertheless, the boats put out into the black night, and presently one of them returned with one rescued man, almost completely exhausted.

The man was carried to the nearest house, shivering and nearly paralyzed with fright at the sight of the uniforms worn by the police and coast guards. He expected instant death. The villagers reassured him, and gradually his terror vanished.

In answering questions the man said he was the captain of a German mine-laying submarine. He had been ordered to lay 10 mines along the coast, and nine of these had been unloaded successfully when the U-boat struck one of them. All the lights were extinguished by the explosion, and almost immediately afterward one of the mines left in the boat let go. The captain, still uninjured, managed to get through the hatch and into the water. The submarine was blown in two.

Papers Inside Lining.—The prisoner was visibly anxious about the loss of his boots. These were recovered, eventually from the water, and a number of confidential papers of great importance were found stitched inside the lining.

The submarine was raised and towed into port. The hulk contained 17 dead Germans and several live mines, one of which is on exhibition at the village pier as a trophy. The wreck of the submarine has been inspected by a number of visitors, including the officer commanding the nearest American naval station.—*Washington Evening Star*, 25/3.

SPAIN AND THE CANARIES.—Count Romanones, months ago, declared that unless Spain meets the situation created by the German submarine blockade with a constructive policy, her internal and external affairs would go from bad to worse. He was a true prophet. Nevertheless, his successors in the premiership have continued to drift. Take, for instance, the Canaries. They are Spanish territory, and therefore assumed to be neutral. But in practice they are being turned to enemy purposes by German influence. The German Consul at Teneriffe, indeed, appears to wield greater authority than the King of Spain. Only a little while ago Spanish subjects were detained by an enemy submarine on one of the islands on the order of this person until it was proved that the word of local Spanish authorities with regard to two men on board a Spanish ship was true. Here was a German in the Canaries exercising the functions of sovereignty openly.

But what of the long series of incidents in which Spain's neutrality has been violated more quietly? If she takes them lightly she can hardly expect the Allies to share her view. The position of the islands, commanding as they do the Atlantic routes, especially those followed by American shipping, is such that with Spanish neutrality more or less leaning to the enemy, Allied merchantmen are at a disadvantage. To put it bluntly, they serve the purposes of German submarines in ways incompatible with strict neutrality. It is about time that some pressure was put upon Spain to deserve less of Count Hertling's and Count Czernin's "gratitude."—*Army and Navy Gazette*, 30/3.

AMERICAN TRAINS GUN TO SINK OWN VESSEL.¹—*First United States Warship to Sink in This War Was the Rehoboth*.—By A. R. Decker, Correspondent of the *Evening Star* and *Chicago Daily News*.—With the American fleet in French Waters, February 10.—Full stories have been published of the torpedoing of the *Antilles*, the *Finland*, the *Rochester*, the *Alcedo* and other American patrol ships and merchant vessels, in which American gun crews and sailors lost their lives. No one, however, has told the tale of the *Rehoboth*, the first American auxiliary warship to be lost in European waters. Only the bare fact that the *Rehoboth* foundered has been mentioned.

The *Rehoboth* was Captain Bill's fishing steamer, with which he used to seine for porgies off the American Atlantic coast. Mobilized with his ship, Captain Bill sailed her across the Atlantic, leaving Boston so loaded with supplies that the *Rehoboth* had a bare foot of freeboard at the waist.

Ensign "Cy" Barnes, former executive officer on the *Rehoboth*, told me how the American ship found its watery grave.

Escort for Convoy.—"We were escorting the convoy," said Ensign Barnes, "when a strong norther caught us off a certain island. Charts name it. The tide running against the wind made a short sea, which kept us continually awash. At every plunge the ship seemed to buckle, perhaps, because of the weight of the guns and their mountings. We pounded away all night. When morning broke the waves seemed to be running higher. The wind was howling like an enraged beast.

"After a few hours of this the *Rehoboth* started to make water. Her seams were opening.

"Captain Bill had been up all night, like nearly all of us. Things looked rather black. He decided that there was no chance of saving his vessel, since we were helpless on a lee shore. So Captain Bill gave the order to abandon ship. Just then a British trawler appeared on top of a big wave.

"With the last few pounds of steam that remained in the boilers, Captain Bill turned his ship so that we ran with the waves. In this position we were able to launch the boats, but not without difficulty.

Captain Wants to Save Ship.—"When Captain Bill saw the trawler hope returned to him. He thought he might yet save his ship. So he returned to the *Rehoboth* and alone tried to get out a towing line. It was no use: the waves were too high and the ship was too waterlogged. Captain Bill jumped back into the small boat when a wave brought it near the rail.

"The transfer to the trawler was as difficult as the departure from the *Rehoboth*. The British tars received us kindly and made us as comfortable as possible, though theirs was a very small vessel and they did not have too much for themselves.

"There was an interesting discussion between the skipper of the trawler and Captain Bill regarding the fate of the *Rehoboth*.

¹ The true story of what happened to the first American fishing vessel mobilized for war has never been told. It is a thrilling story, and Mr. Decker secured it from the lips of Ensign Barnes, who saw the *Rehoboth* go under.

"'She is a derelict,' said the Britisher, 'and if you don't sink her I will have to. Those are my orders.'

"'Go ahead and sink her, then,' said Captain Bill.

American Sinks Own Ship.—"The British gun crew opened fire on the unfortunate *Rehoboth*, but so lively did she bob around in the choppy seas, that the projectiles fell too short or too long. Finally, an American gunpointer took a shot at his own ship. It was a wild scene, the British trawler jumping so that her own sailors would exclaim, 'Roll, you bloody rascal! When are you going to turn over?'

"The fire reached the magazine, which exploded, in a final fitting salute to the sinking of the *Rehoboth*. Some mines also exploded and caused the trawler to tremble. A few minutes later the *Rehoboth* sank."

When the work of the American fleets is summed up it will be found that the fishing steamers, the converted yachts and the destroyers of the first contingent filled a breach which, unfilled, might have had a serious effect upon the outcome of the war.—*Washington Evening Star*, 28/3.

GENERAL PERSHING PRAISES CREW FOR REPAIRING VESSEL.—*Seamen on the Woonsocket Saved Much Money and Time in French Port.*—Herald Bureau, No. 1502 H. Street, N. W., Washington, D. C., Sunday.—General Pershing, in a despatch made public by the War Department to-day, commended the crew of the steamship *Woonsocket* for exceptional service in assisting in unloading the cargo in a French port, and making repairs to the hull of the vessel, thereby saving time and expense for the government, which is sorely in need of ships.

In making public General Pershing's despatch, Major General George W. Goethals deploras the fact that no means has been provided by the government for rewarding services of this kind. It is probable that Congress will be asked to authorize a reward of some kind for such exceptional services. In his despatch to the department, General Pershing says:

"While in port here the crew of the steamship *Woonsocket* rendered exceptional service in getting cargo ashore and at the same time making repairs to the hull. This voluntary action on the part of the crew saved a delay which might have amounted to a week, and also saved an expense of several thousand dollars. All officers who have knowledge of this matter have recommended that such recognition as may be possible be extended to this crew in form of bonus or special privileges. Recommend that the extraordinary amount of work and efficiency shown by this crew should if possible be made known generally in such a way as to secure emulation."

General Goethals transmitted this report of General Pershing to the commanding general of an Atlantic port of embarkation with the following comment:

"It is directed that upon the return of the steamship *Woonsocket* you express to the master and crew of that vessel the appreciation of the department for the voluntary services rendered and grant them such special privileges as under the law and regulations can be granted in the premises.

"Their attitude in assisting the unloading of the vessel and doing everything possible to expedite its departure from port is commendable and establishes an example which it is hoped that all other crews in the army transport service will follow.

"This office regrets that a more substantial means of rewarding services of this kind is not available."—*N. Y. Herald*, 8/4.

SHIP BUILT IN 108 DAYS.—Washington, April 17.—A new record for merchant shipbuilding was announced in the contest between yards for pre-eminence in turning out such vessels. The Skinner and Eddy Shipbuilding Company, of Seattle, has delivered to the shipping board the 8800-ton freighter *Ossineke* in 109 days from the time the keel was laid, 81 days ahead of the date set in the contract.

In pre-war times, 12 to 18 months were required for the delivery of such a craft. The best previous record for completion of a large vessel was 113 days, made by the Columbia River Shipbuilding Company, of Washington State, in building the 8800-ton *Canoga*.

Eastern shipyards are trying hard to take the honor of fast work away from the Pacific coast, but so far have failed to equal the western speed. Chairman Hurlley received to-day photographs from a certain unidentified eastern yard, where a strenuous effort is being made to put a vessel into water in approximately 50 days. The photographs are being taken daily, showing the growth of the vessel under the hammers of the workmen. Until the launching is done, the name of the yard will not be made public.—*Baltimore Sun*, 18/4.

THE "CELTIC" SAFE IN BRITISH PORT; LIFE LOSS SMALL.—Safe in a British port, the steamship *Celtic*, of the White Star line, which was struck two days ago by a torpedo, is still afloat. The vessel was towed into the port yesterday for repairs, which will enable her to resume her work as a cargo vessel.

News that the steamship had been saved was cabled to the New York City offices of the line. This satisfied officials of the company, for it meant and on the men in the water, and, after jeering at them, made off. The *Celtic* is used exclusively as a cargo steamship at present, and was on a voyage from England to the United States when attacked.

Although the *Celtic* was built in 1901, she still is one of the staunchest steamships in the North Atlantic trade. Her loss would have been equal to the destruction of at least six or eight ordinary vessels in freight service. Hundreds of thousands of tons of freight have reached England each year as the result of her service. She is rated high by Lloyds' and is fully covered by regular and war risk insurance, but in the present crisis, because of the great need for bottoms, her monetary value is of little consideration, her actual service being the only thing considered.

Details of the damage to the vessel have not been received here. Officials feel confident, however, that the 21,000-ton vessel soon will be in commission, because they think that if she was able to make a port she can be repaired with rapidity.—*N. Y. Herald*, 2/4.

U-BOAT SINKS THIRD U. S.-SEIZED VESSEL.—London, March 25.—The Admiralty announces that the American steamship *Chattahoochee*, 5088 tons net, has been sunk by a German submarine off the English coast. Her crew of 78 was landed safely. The master states that the submarine fired a number of torpedoes, of which four struck the vessel.

New York, March 25.—The steamship *Chattahoochee*, torpedoed off the English coast, was formerly the Hamburg-American liner *Sachsen* and was one of the vessels seized by the United States when this country entered the war. She was built in 1911, at Belfast, and was 470 feet long with a 58-foot beam.

The *Chattahoochee* left an American port last January 27, with a cargo for London. Advices received by the United States Shipping Board here were that she arrived safely, discharged her cargo and was being used in foreign waters in connection with the transport service of the American Army there. The vessel was commanded by Captain P. C. Lawe.

When the European war broke out the vessel was engaged in the Pacific trade and was self-interlined by her captain at Manila. After being taken over by the United States she was loaded with cargo for Seattle and from that port sent to the Atlantic through the Panama canal, arriving here the latter part of last December. When she last left for London the vessel was unarmed. The *Chattahoochee* is the third of the seized German ships to be sunk by submarines.—*Evening Star*, 25/3.

AMERICAN DEVICE TRAPS 12 U-BOATS, SAYS C. E. MITCHELL.—*National City Company's President Tells News of Successful Test of New Invention.*—An American invention has resulted in the capture of more than a dozen German submarines in two days, according to information which Charles E. Mitchell, president of the National City Company, said he had received yesterday.

"Within the last hour I have received word from a most reliable source," said Mr. Mitchell, addressing 300 Liberty Bond workers of the Electrical Division of the Rainbow Division, Liberty Loan Committee, at the Edison Company's rooms, Fifteenth Street and Irving Place, "that America has put forward a new invention which has been tried against the German U-boats, and that this invention was so successful that more than a dozen submarines were captured within a space of two days."

When the meeting had ended Mr. Mitchell was asked for further information about the invention.

"Not another word," he said. "I have said all I can say at this time."

Mr. Mitchell refused to give the source of his information and said he did not know whether a public announcement might be expected from Washington. He did say, however, that he had confirmation of the reports that American chemists had perfected a new corrosive gas which would have an important bearing on the war.—*N. Y. Herald*, 17/4.

HOW A GOTH A AND ITS CREW WERE CAPTURED.—*French Farmer's Presence of Mind.*—From our own Correspondent.—Paris, March 19.—The Boulogne correspondent of a northern local journal gives an exciting account of how a Gotha and its occupants were captured recently.

Midnight had just struck at the church of Sains en Gohelle, not far from Béthune, last Wednesday, when a farmer living on the edge of the village heard some one knocking at his door. He arose, and going down half-dressed found two aviation officers. "We have had a breakdown with our motor-car close by," said one, speaking in good French. "Could you make us a cup of coffee and get some petrol?"

"Coffee is easy enough," replied the farmer, "but not petrol. If you go a little farther to the marketplace, you will find British lorries, which will supply you." "Oh, British lorries," said the flying man, and he appeared worried.

The two men drank a big bowl of coffee eagerly, and then offered the farmer a round sum of money for civilian clothes. The farmer's suspicions were now aroused, and he at once called his servants and in a body they accompanied the airmen to the nearest British post, where the strangers confessed that they were Germans, and were arrested. They said that they had come from a raid on Boulogne, and had been forced to land 10 miles from the front for lack of petrol. They had left two non-commissioned officers in charge of their machine, which was a Gotha of the latest model, close by. When the machine was reached one of the non-commissioned officers had already taken to his heels, but he was captured two hours later. The other non-commissioned officer was in the act of destroying the instruments, and had unsuccessfully attempted to burn the Gotha.

"You had better take your lorries to a safe place," remarked the commander of the machine half jokingly, "because to-morrow night there is a chance of their blazing." The hint was, of course, taken.

As for the officer who spoke French so well, he had been a medical student in Paris before the war, and he commanded a squadron during the Gotha raid on Paris a month ago.—*London Times*, 21/3.

ANOTHER NAVAL YARD FOR GERMANY.—*Capture of Nikolaieff.*—German report: In Southern Ukraine, Nikolaieff has been occupied.—*Admiralty, per Wireless Press.*

The capture of Nikolaieff, which was unofficially reported from Petrograd on Sunday, places the chief naval yard on the Black Sea in the enemy's

hands. Most of the large vessels of the Black Sea fleet were built there, including the three 22,500-ton battleships of the *Imperatritsa Maria* class.

The town has 106,000 inhabitants, and is situated nearly 70 miles north-east of Odessa. Besides its naval pre-eminence, Nikolaieff was also before the war one of the chief ports for the export of cereals from the most fertile governments of the Ukraine, immense storehouses having been built in the commercial port. The town is protected by several forts, but no resistance seems to have been made to the Germans.—*London Times*, 19/3.

U-BOAT STORIES.—The Admiralty has afforded representatives of the press an opportunity of reading the logs of a number of vessels which have been sunk or attacked by enemy submarines, and the information derived from these records will enable the public to judge more practically than has yet been the case of the splendid services which have been uncomplainingly rendered to the nation by the mercantile marine. These official records of seafaring captains who have been the victims of submarine attacks show that our sailors have been shot at, jeered at, and left to the mercy of the waves, and that their ships have been "looted" before being sunk. At the same time, the logs reveal the fact, in one or two instances, that submarine crews have shown a dislike for their nefarious work, and that help has been given to sailors who were struggling for their lives in the open sea.

The following are some of the incidents recorded:

In the case of one ship, on which there were 47 hands, the boatswain was standing abreast of the main mast when he saw the wake of a torpedo as it approached, and he had no time to report before the vessel was struck. After the explosion all hands were sent on deck. The ship sank stern first. There was no time to lower the boats, and practically the whole crew had life-belts on when thrown into the water. When the submarine came to the surface a line was thrown to a raft which the crew had managed to launch, and it was hauled alongside the enemy vessel. A colored man was ordered on board, and as soon as he stepped on the submarine both his wrists were seized, and he was firmly held while being interrogated. The enemy took a photograph of him and also of a man on the raft. When the interrogation was completed the colored sailor dived from the submarine and swam to the raft. As the ship was sinking the master dived off the bridge; he was not seen later. A number of men were rescued after being in the water for four hours.

Robbery was reported in connection with another attack. After the vessel had been shelled many times, the master and crew abandoned the ship, lowered the lifeboat, and rowed towards the submarine. Eight shots were fired at the lifeboat, followed by four revolver shots. It was only then that the crew saw the submarine, which was about 500 yards away. The captain and his men were taken on board; and the commander of the submarine boarded the vessel, removed the clothes, provisions, and papers, and left bombs on board which afterwards blew her up. The master was searched, and £22 5s., with his watch and chain, was taken from him. The commander of the enemy vessel said that there was no food left in the submarine, which had been six weeks out, and he also mentioned that food in Germany was very short. During the night the crew were picked up by a destroyer.

"Torpedoed, and on her beam ends, but not actually seen to sink," is the description given by a captain of an attack on his vessel. She was struck between the stokehold and No. 2 hold, both of which were blown in. The crew had time to take to the boats. The German captain, speaking in perfect English, asked for the name of the ship and her tonnage, and verified the particulars given to him by reference to *Lloyd's Register*. The master's boat, with 23 men, reached shore the following day, and the mate's boat, with the remainder of the crew, was picked up. It was reported by the master that the officers and men of the submarine were "quite friendly and polite."

One night a vessel was struck by a torpedo. The engines were stopped, and all hands went to the boat stations. The port boat was lowered safely, but within three minutes the ship sank and the davit caught it and capsized it, all hands being thrown into the water. The second officer went down with the ship, but seized hold of the capsized boat and climbed on top of it. The boatswain also was taken down, and he, too, as well as a seaman, got on the boat. After they had been on the upturned boat for some minutes a submarine appeared and hailed them to come on board. They explained that it was impossible. The submarine went ahead, and about a quarter of an hour later returned, and the men were again asked, in a rough voice, to come on board. The same answer was given, whereupon the submarine again went ahead, putting her helm over, and the whole of the men were thrown into the water. Those on the submarine must have known that there was a man under the boat, as they could easily have heard him knocking. His comrades, however, pulled out the plug and gave him air, and eventually the boat was righted and he was rescued.

One of a group of other ships was torpedoed and the crew took to the boats, one of which capsized, and seven of the men managed to reach the lifeboat. The submarine came close, flashed her searchlight on the boat and on the men in the water, and, after jeering at them, made off. The survivors were picked up by a French torpedo-boat next morning.

Attacked by a U-boat, which fired two shots, the master got out the boats, left the ship, and pulled towards the enemy vessel. The commander took four or five of his own men in the ship's boat and put some bombs on board. As these failed to explode he went back for more explosives, taking with him everything out of the ship that could be carried—food, clothing, compass, and all the metal that the enemy could lay hands on. The vessel was then blown up, the crew in the meantime being on the deck of the submarine. They were treated very badly, their clothing being thrown out of the boat into the sea. Only one oar was left them, five having been flung overboard. The master begged for another, but he could not get any more.

Two submarines were sighted at a distance of about six miles attacking a barque. The master of the observing vessel altered his course and lit a smoke cowl to screen his ship, but it was not very effective. Shortly afterwards he was attacked by one of the submarines. Being armed the vessel opened fire, but the U-boat was not within range, and a shot from the submarine struck the ship. Orders were given to haul down the ensign, and steps were taken to abandon her. The boats were lowered and the ship was abandoned the enemy still firing. The ship was hit 19 times before the crew were properly clear. When the submarine came up the vessel was "generally looted," everything the enemy could lay their hands on being taken, including the spirits in the bonded room. Some of the Germans were seen drinking on the bridge. The enemy were alongside for about an hour, and "treated our men quite fairly, even returning some of their personal gear which they had looted." The enemy crew were very particular in getting all the leather they possibly could, even going so far as to take old boots which were long past usage. Soap was also in great request, and a tin of lard was considered a prize.

In another instance, a vessel struck on the port side in the engine room went down at once, the crew having only time to launch the boats. About 10 minutes before the ship was torpedoed a floating object was sighted, which appeared like a small vessel bottom upwards. This was reported by flag code to another vessel close by, but no reply was received before the ship was hit. The master was of opinion that this object must have been placed there as a decoy by the submarine to draw the attention of the "lookouts" away from herself.

When a motor schooner was struck the ship's boat was rowed to the submarine, and the master and one man were taken aboard. The submarine then towed the boat to a disabled ship, and sent two men on her with

bombs. An officer asked the master, "What was the cargo? Where from? Where bound? Why did the ship not come with convoy?" The officer spoke in very good English, being prompted in German by the captain of the U-boat. The master and crew were much struck by the pallid appearance of the officers and crew of the submarine and by their nervous and excited manner. The commander was continually urging haste, and the officer who was placing the bombs on board could hardly hold them owing to his nervous tension. One of the crew of the submarine who had lived long in England, speaking to the ship's crew, cursed the war, and said that he wished it was over, exclaiming that it was not their fault, but that they had to do their duty. "You won't believe it in England," he added, "but it's true." The submarine appeared to be of an old type and to have been a long time at sea. —*London Times*, 18/3.

PRISONERS ON U-BOAT.—*First Officer of the Atlantic Sun, Tanker, Taken off.*—An Atlantic Port, April 6.—When the American oil steamship *Atlantic Sun*, of 2333 tons gross, was torpedoed and sunk by a German submarine in the war zone a few weeks ago the first officer was taken prisoner by the crew of the U-boat, according to members of the oil vessel's crew, who arrived here to-day.

Capt. Walter K. Miller, who confirmed the story of the sailors, told of his own remarkable escape from death. A torpedo struck the *Atlantic Sun* in the port side and penetrated an oil tank, which, exploding, blew a large hole in the side of the vessel. The captain's cabin was wrecked and the skipper fell into the hold and the rush of oil to the surface carried him through the aperture which the torpedo had made and he found himself floating in the débris.

Told Captain Was Dead.—While the submarine was shelling the damaged vessel the latter's crew rescued Captain Miller. The U-boat approached their life-boat and the second officer informed the Germans that the captain had perished. The submarine commander thereupon ordered the first officer, whose name Captain Miller would not disclose to-day, into the U-boat, the German explaining that he was obliged to produce an officer in order to obtain a bonus which, he said, the German Government had offered for sinkings.

The *Atlantic Sun* hailed from Philadelphia. She was built at Newcastle, Del., in 1893.—*Baltimore Sun*, 7/4.

TRAPPING U-BOATS.—A Dutch correspondent has received from a German sailor interned in Holland a lively account of his first and last adventure in a German submarine.

After being interned in England for a short time, he made good his escape with a fellow-prisoner in a small boat, and was picked up by a German submarine near the English coast. Soon afterwards the submarine sighted some fishing vessels, but their curious movements caused the Germans to suspect a submarine trap, and they dived. They proceeded slowly submerged, but presently the screw began to beat irregularly, and the commander could not make out what happened.

After about two hours the water seemed curiously still, and as it felt as if they were making no headway the commander decided to come to the surface. When they emerged, they were alongside a quay full of laughing faces of British naval officers and bluejackets.

They were safely in a British port—"Just towed in like a blooming fish," said the German.—*London Times*, 15/2.

SUBMARINE FIRES ON FISHING-BOAT CREW.—The unarmed Irish coasting schooner *Nanny Wignall*, 93 tons gross, was sunk off the Irish coast by a German submarine March 12. As two wounded seamen were being rescued by their shipmates the submarine fired on them.—*Army and Navy Journal*, 16/3.

ON CONVOY DUTY.—The following account of the work of British destroyers on convoy duty is supplied by a special correspondent who recently made a cruise in the leader of an escorting flotilla.

We were in the harbor of a famous southern port on board the leader of a destroyer flotilla ready to start on one of its ordinary cruises as escort to merchant convoys. It was a cold, bleak, stormy day, with a fine cross sea running in the Channel. One after the other the members of the flotilla cast off from the buoys, and slipped silently seaward. In the outer harbor were the huge merchantmen we were to escort into the comparative safety of the broad Atlantic. They were a strange, motley-looking crowd, with a camouflage appearance of the weirdest description, calculated to send futurist artists into ecstasies. These weird-looking vessels followed the destroyers in single file out of the harbor at slow speed until well into the Channel. There they were formed up and made into as compact a crowd as possible. A destroyer in front and others on each flank constituted a protective screen. After we had got well out and had lined up our escort full speed ahead was ordered, but that was full speed for the convoy only. The destroyers were at about half speed, and this was partly expended in zig-zagging. To and fro, without a moment's respite, the leader proceeded in front of the convoy, always about 500 to 600 yards ahead, as though showing to timid followers that it was perfectly safe to follow where we led. On the flanks other destroyers kept up the same zig-zag procedure, and astern yet another zigged and zagged and did her best to keep the rear most ships up to the full convoy speed.

Night shut down on us like a black blanket, adding greatly to the difficulties of the escort. Not a star was to be seen, not a light permitted to be visible on any ship. At 400 yards distance very sharp-eyed look-outs could just discern misty black shapes, and carry on navigation with just sufficient accuracy for safety. Frequently it became necessary to ask, by means of a few short, sharp flashes with an electric signal lamp, where the respective units of the convoy were. Despite the utmost care lavished upon them, they had straggled, and were covering a wide distance. "Cannot effectively screen you if you scatter like this," we signalled. Later we ran into a fog bank, which absolutely obscured visibility, and rendered zig-zagging a dangerous procedure. The look-out was increased, and the speed of the escort reduced to that of the convoy, while touch was kept by frequent speaking or whispering on the sirens. Hour after hour dragged slowly on, until by the time the sun had burst through in the morning and the flotilla had rounded up the scattered ships into good position again, we had passed through a fog bank 60 miles in length. Then the dreary zig-zagging by the destroyers was resumed. Throughout the day there was no incident to relieve the routine of the voyage. The zig-zagging proceeded with regularity, the ship continued her steady roll, and the waves continued to wash the decks everywhere abaft the forecastle head. And so on into the night again. By midnight the allotted hundreds of miles to comparative safety for the convoy had been almost covered. Later it was decided to bid them farewell, and so there were a few more flashes from the lamps. "Wish you safe and pleasant voyage" from the leader of the escort was responded to by "Thanks for your efficient escort" from the commodore of the "empties," and convoy and escort separated and went their respective ways into the blackness of the night.

The destroyer escort proceeded on a straight course that had neither zigs nor zags in it, but at a speed of about 20 knots. Somewhere out in the black unknown, in the region of a given point, we were to meet with a convoy of laden ships, and escort them to safety. They were about 80 miles away when we started to look for them, and in the early daylight many eyes glued to glasses were sweeping the horizon. A dirty little smudge on a fleecy cloud that seemed to be resting on the water as far away as the eye could reach first attracted attention. The smudge moved and grew large; other smudges appeared and took definite shapes; the objective was

in sight. In half an hour we were within "speaking" distance and had exchanged greetings and turned about. Positions were again taken up, and the homeward journey with the fully laden convoy was begun.

We had met in those wide waters within half an hour of the fixed time. There were not so many homeward ships as there had been outward. They had been escorted so far by a British armed cruiser—a modern P. and O. liner. One ship was laden with meat for France, and she went off towards her destination with an attendant destroyer. The armed cruiser with another destroyer also left, her speed being probably a sufficient safeguard as far as her home port. The remaining food ships and destroyers shaped a more northerly course. An S.O.S. from a hospital ship caused a momentary bustle and a hasty calculation of her position. She was at least 200 miles away, and therefore beyond our aid; but in a few minutes came another wireless message cancelling the S.O.S. and making us more easy in our minds. Another message told of the sinking of a small Norwegian vessel, and the rescue of her crew not very far away. Still another told of heavy firing west of the Scillies, but this proved to be a patrol sinking a floating mine. Then there was an intimation from a point about 30 miles away that a destroyer was busy with a submerged submarine, tickling her up with depth charges, or what the sailors call "pills."

For two days and nights we proceeded steadily towards the home port indicated on the sailing instructions, altering courses on receipt of shore instructions as to the last whereabouts of "Fritz." We arrived at the very gates of the great empire city port and there, with their charges in safety, the destroyers just "dipped" *au revoir*, turned about, and swept away on their 400 miles homeward journey.

"I am afraid," said our commander before I left, "there is not much in this business for you to write about, so you will have space to say something on behalf of the men. They are really splendid. They have little enough to be jovial about, and not a bit of comfort on these vessels and on this kind of work. Yet it seems that the more the discomfort and the greater the hardship, the more cheerful they are. They are our greatest national asset."—*London Times*, 19/3.

CALLS FOR AMERICANS.—London, April 15.—"What is now most pressing required is that the fighting forces of the United States should be brought as speedily as possible into the field," said A. J. Balfour, the Foreign Secretary, in speaking at a luncheon to the American labor delegation to-day.

"The German plan," continued Mr. Balfour, "is to shatter the British Army before the American weight can be brought into the scale. The German inspired press has been instructed by its masters to show the utmost contempt for the American military effort. But the masters do not share that contempt. They are planning their whole campaign and are sacrificing men with reckless extravagance in order that the American help may arrive after their blow has been struck."

In proposing a toast to the allied cause, Mr. Balfour said:

"The speeches which we have just listened to would have convinced any doubter, if such exists elsewhere, that the spirit in which the United States of America have thrown themselves into this great struggle is a spirit of idealism—not an idealism that evaporates in eloquent, empty phrases and empty formulæ, but that idealism which recognizes that, to bring his ideals to fruition, one must make efforts and show those great sacrifices which now are being so surely demonstrated by our friends and brothers across the Atlantic.

"There was a moment before the facile success which Germany obtained against an unresisting enemy, an enemy in the East, when German statesmen and German members of parliament discussed public affairs in a way which would lead one to suppose that Germany was in a high way to

democratic institutions and to heartfelt adoption of the four principles which President Wilson has made famous throughout the world.

"They now almost cynically admit that the resolution of the Reichstag, of which we have heard so much, all the talk of no annexations and no indemnities, of considering the wishes of subject populations, of spreading the principles of security and freedom throughout the world, was what we sometimes call camouflage."

"Germany now stands forth undisguised as a robber state," declared Mr. Balfour. "How is she going to carry out her robbery so far as her internal politics are concerned? Her methods are simple. If things are going wrong, or are not going as well as her optimists expected, then they tell the German public:

"'You must fight on because the powers against whom you are fighting desire nothing less, and will be content with nothing less than the total destruction of your country.'

"An absolute falsehood! The destruction of Germany has never been an allied aim, and is desired, so far as I know, by no sane man in the whole civilized world.

"But if things are going well that argument is put aside and a new one comes in. They explain that all these attacks upon the constitution of Germany, all this talk about Germany not being a land of freedom, with the representative institutions of democracy as we in the West understand them, are quite true. But then they say: 'A democratic government would never have given you an empire such as the military authorities and the headquarters staff have given you. We are the headquarters staff. We are the military authority. We are the true upholders of the Prussian ideals.

"'Look at what we are giving you. We are going to give you domination over the whole of Europe. You have practically control over the independent states all along our eastern border. We are going to give you a free pathway to the illimitable riches of the East. We are going to turn France into a second-rate power. Britain is to follow, America is to follow Britain, and Germany is to be the Colossus which bestrides the world, without a rival and hardly a critic.'"—*Baltimore Sun*, 16/4.

FLIES OVER THE ANDES.—Buenos Aires, April 15.—Lieutenant Cendelaria, of the Argentine Army, to-day crossed the Andes by airplane from Zapala, Argentina, to Curico, Chile, a distance of 180 kilometers. The machine crossed the mountains at an altitude of 3200 meters.

This is the first recorded crossing of the Andes by airplane. On June 24, 1916, a balloon operated by Captain Zuloaga and Engineer Bradley, crossed the Andes from Santiago, Chile, to Uspallata, Argentina.—*Baltimore Sun*, 16/4.

CHARLES M. SCHWAB DRAFTED TO DIRECT WAR SHIPBUILDING.—Charles M. Schwab, the steel master of the world, to-day answered the call of the nation to take full charge of war shipbuilding in the United States. At the request of President Wilson he accepted the newly-created post of Director General of the Emergency Fleet Corporation, with almost unlimited funds to construct a gigantic merchant fleet so vital to the winning of the war.

"Build ships," Mr. Wilson directed. "We will do the rest."

Mr. Schwab will drop all his other work to serve the government. He will be unhampered in the direction of construction which now is going on in 130 shipyards throughout the country.

The White House announced the appointment of Mr. Schwab this afternoon after a conference between the President, Mr. Schwab, Edward N. Hurley, chairman of the shipping board; Bainbridge Colby, a member of the board, and Charles Piez, vice-president and general manager of the Emergency Fleet Corporation.

Here is the statement, issued by Joseph P. Tumulty, secretary to the President:

"Edward N. Hurley, Charles M. Schwab, Bainbridge Colby and Charles Piez were received by the President at the White House to-day. It was stated that the subject discussed was the progress and condition of the national shipbuilding program. The carrying forward of the construction work is so vast that it requires a reinforcement of the shipbuilding organization throughout the country.

"Later in the day, Mr. Hurley, chairman of the shipping board, announced that a new office, with wide powers, had been created by the trustees of the Emergency Fleet Corporation. The new position is that of director general and Mr. Schwab has been asked and has agreed to accept this position in answer to the call of the nation.

"Charles Piez, vice-president of the Emergency Fleet Corporation, recommended that the post of general manager of the corporation be at once abolished so that Mr. Schwab as director general should be wholly unhampered in carrying out the large task entrusted to him. Mr. Piez, since the retirement of Admiral Harris, has been filling both the position of vice-president and that of general manager.

"Mr. Schwab will have complete supervision and direction of the work of shipbuilding. He agreed to take up the work at the sacrifice of his personal wishes in the matter. His services were virtually commandeered. His great experience as a steel maker and builder of ships has been drafted for the nation."

The selection of Mr. Schwab is hailed throughout official Washington, to-night, as a master stroke. Admittedly at the head of the largest steel producing organization in the world and employer of more than 130,000 men in many different plants, he will have a tremendous advantage in getting material for construction. He is in the confidence of the most important capitalists in the country; he is a man of wonderful energy and ability in organization.

Mr. Schwab will devote himself to building ships exclusively. He will be in the field most of the time speeding up his production. He will give the orders directly. Every bit of authority will be in his hands.

Mr. Schwab is to take up the shipbuilding program as he found it, providing for the construction of steel and wooden vessels. There will be no loss, therefore, in discussion of new ideas. The foundation for a fleet already is laid. The thing now to be done, Mr. Schwab agrees, is to turn out vessels as quickly as possible.

The idea of calling in the services of Mr. Schwab developed last Friday, and the question was broached to him Sunday. But he did not decide to accept until afternoon to-day at a meeting of the trustees of the Emergency Fleet Corporation. At that meeting with the trustees he demonstrated strikingly his determination to round out an efficient, harmonious organization. The trustees sat around a table telling Mr. Schwab what they hoped he would do. When he heard it all he arose from his chair and pointed his finger at each in turn.

"Will you help, Mr. Hurley?" he asked.

"Yes," replied the chairman.

"Will you help, Mr. Donald?" addressing James A. Donald, a member of the board and one of the trustees.

"Yes," said Mr. Donald.

So he went around the table, receiving a pledge from each.

"All right," Mr. Schwab announced. "I'll take the job if the President desires."

The idea of calling for Mr. Schwab came at a conference between Mr. Hurley and Mr. Piez last Friday over the necessity of obtaining help from "some of the biggest men in the country" to speed up the lagging building program.

"We need somebody like Schwab," said Mr. Piez.

"Why not Schwab?" asked Mr. Hurley.

Mr. Schwab arrived in Washington Sunday morning. He had luncheon with Mr. Hurley at his residence, and Mr. Hurley asked him to take the place. Mr. Schwab said he would like to serve the government, but that he felt that before giving an answer he would have to confer with his business associates. He did that Monday, arriving here to-day for the final arrangements. He returned to New York City to-night, but will be back again on Thursday to go to work.

Throughout the negotiations there was not one word of salary. But Mr. Schwab will receive at least \$1 a year from the government for his services, under the rule that the government cannot accept anything without pay.—*N. Y. Herald*, 17/4.

MODIFICATION OF REQUIREMENTS FOR SEA DUTY.—In a communication to Congress, Secretary Daniels said that unless the law requiring two years' sea duty before a naval officer can receive promotion is modified great injury will be done the administration of the Navy Department. He called attention to the fact that many officers, whose services in war are indispensable at their present assignments in the department will seek sea duty in order to obtain the promotion that is due them unless the law is changed.—*Official Bulletin*, 17/4.

FIRST HUN CAPTIVES REACH THIS COUNTRY.—An Atlantic Port, April 16.—The first German prisoners of war arrived in the United States to-day. They are members of the crew of the submarine *U-58*, which was sunk by an American destroyer. The prisoners are to be interned.

Their exact number was not given out, but it is believed there are about 20.

With the War Department taking over for the navy the *U-58* prisoners captured by the destroyer *Fanning* there still remains the problem of whether or not General Pershing's prisoners shall be brought back here. A decision on this point is expected soon, but meantime the Teutons taken by the Yankees remain in French prison camps.

That some complaints of German food and camp conditions have come from American prisoners in Germany became known to-day. Some of the men reported that they did not have enough blankets, while others said they were given either poor quality food or little of it. International law requires a nation to feed its prisoners as it feeds its own soldiers. This Germany is not doing, though the United States is scrupulously observing that regulation. Now America purposes that the interned sailors and other prisoners already on hand and the *U-58* men coming here shall work for their "chow."

To relieve American prisoners in Germany from poor or insufficient food, the United States Government has established the same system as the British, feeding the prisoners herself. This is done through a committee at Berne, Switzerland. This committee supplies food packets now. The camps where Americans are detained are inspected regularly by Spanish Embassy agents, who take up with Germany any complaints that German food instead of the American supplies is given the men. Three 10-pound packages of food are sent every two weeks and clothing is replenished every six months. Apparently the complaints of some prisoners have resulted from German substitution of made-in-Germany products for the American goods.—*Baltimore Sun*, 16/4.

BARON BURIAN TO SUCCEED CZERNIN.—Amsterdam, April 17.—Baron Burian has been appointed Austro-Hungarian Foreign Minister to succeed Count Czernin, according to a Vienna dispatch.

Baron Stephen Burian von Rajecz was Minister of Foreign Affairs from September 15, 1914, to December 23, 1916, when he was succeeded by Count

Czernin, whose place he now takes. Baron Burian has been Austro-Hungarian Finance Minister since Count Czernin has been in the Foreign Office.

Baron Burian took the place of Count Berchtold as Foreign Minister in 1914 and he was the author of the notes to the United States on the case of the Italian steamship *Ancona*, sunk in the Mediterranean with the loss of American lives in the fall of 1915.

Creates Sensation.—Basel, Switzerland, April 17.—The tone of the Austrian and German press indicates that a profound impression has been caused in those countries by the downfall of Count Czernin. The German people and the German element in Austria resent the retirement of the minister, and after his resignation was announced they began a vigorous campaign for the appointment as his successor of former Premier Tisza, Count Andrássy or another Hungarian whose views agree with theirs.

The same elements which deplore the fall of Count Czernin are beginning to attack the German Foreign Minister, Dr. von Kuehlmann, on the pretext that he did not protect Germany's economic interests sufficiently in the treaty of Brest-Litovsk.—*Baltimore News*, 17/4.

NINE HUNDRED REVOLUTIONISTS HEAD FOR COSTA RICA FROM NICARAGUA PORT.—San Juan Del Sur, Nicaragua, Monday.—A telegram from La Cruz, on the Costa Rican frontier, reports news has been received there of the departure from Panama of a steamship carrying troops to assist in the revolutionary outbreak which recently was begun in Costa Rica.

According to this account, there are on board the vessel 900 fully equipped Costa Rican revolutionists, under command of Jorge Vilio, the rebel leader, and they are expected to make an early attempt at a landing.—*N. Y. Herald*, 8/4.

COSTA RICA CONGRESS DECLARES MARTIAL LAW.—San Jose, Costa Rica, Sunday (Delayed).—The Costa Rican Congress has proclaimed martial law in connection with the revolutionary outbreak on the southern border and the government is taking necessary steps to capture or disband the rebels.

It was thought that Jorge Vilio, the rebel leader, who is a priest, and his followers had been disarmed by the Panama Government.—*N. Y. Herald*, 8/4.

INDEX OF WAR VESSEL LOSSES MENTIONED IN THIS NUMBER

NOTE.—A complete table of losses since the beginning of the war will be published semi-annually; the latest appears in the January number of the PROCEEDINGS.

BRITISH VESSELS

<i>Boxer</i> (destroyer)	1146
Destroyer	1147
Destroyer	1148
Destroyer	1148
Destroyer	1148

GERMAN VESSELS

2-U (?) (submarine)	1137
1-U (submarine)	1143
3-U (submarine)	1143
3-U (submarine)	1143
1-U (submarine)	1145
U-48 (submarine)	1147
1-U (submarine)	1148

GERMAN VESSELS—Cont'd

1-U (submarine)	1148
10-U (submarine)	1149
1-U (submarine)	1149
2 Torpedo-boats	1147
<i>Frankland</i> (transport)	1152
Transport	1153

RUSSIAN VESSELS

<i>Admiral Makaroff</i> (ar. cruiser)	1152
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UNITED STATES VESSELS

<i>Admiral</i> (patrol vessel)	1136
<i>Cyclops</i> (collier)	1138

DIPLOMATIC NOTES

FROM MARCH 18 TO APRIL 18

PREPARED BY

ALLAN WESTCOTT, PH. D., Instructor, U. S. Naval Academy

PRESIDENT WILSON'S BALTIMORE SPEECH

On April 6, President Wilson delivered an important speech in Baltimore, in which he declared that the true aims and methods of the Central Powers were revealed not by their diplomats, but by their military leaders, and that force alone can bring peace. The speech follows in full:

Fellow citizens: This is the anniversary of our acceptance of Germany's challenge to fight for our right to live and be free, and for the sacred rights of free men everywhere. The nation is awake. There is no need to call to it. We know what the war must cost, our utmost sacrifice, the lives of our fittest men and, if need be, all that we possess. The loan we are met to discuss is one of the least parts of what we are called upon to give and to do, though in itself imperative. The people of the whole country are alive to the necessity of it, and are ready to lend to the utmost, even where it involves a sharp skimping and daily sacrifice to lend out of meager earnings. They will look with reprobation and contempt upon those who can and will not, upon those who demand a higher rate of interest, upon those who think of it as a mere commercial transaction. I have not come, therefore, to urge the loan. I have come only to give you, if I can, a more vivid conception of what it is for.

The reasons for this great war, the reason why it had to come, the need to fight it through, and the issues that hang upon its outcome, are more clearly disclosed now than ever before. It is easy to see just what this particular loan means because the cause we are fighting for stands more sharply revealed than at any previous crisis of the momentous struggle. The man who knows least can now see plainly how the cause of justice stands and what the imperishable thing is he is asked to invest in. Men in America may be more sure than they ever were before, that the cause is their own, and that, if it should be lost, their own great nation's place and mission in the world would be lost with it.

I call you to witness, my fellow countrymen, that at no stage of this terrible business have I judged the purposes of Germany intemperately. I should be ashamed in the presence of affairs so grave, so fraught with the destinies of mankind throughout all the world, to speak with truculence, to use the weak language of hatred or vindictive purpose. We must judge as we would be judged. I have sought to learn the objects Germany has in this war from the mouths of her own spokesmen, and to deal as frankly with them as I wished them to deal with me. I have laid bare our own ideals, our own purposes, without reserve or doubtful phrase, and have asked them to say as plainly what it is that they seek.

We have ourselves proposed no injustice, no aggression. We are ready, whenever the final reckoning is made, to be just to the German people, deal fairly with the German power, as with all others. There can be no difference between peoples in the final judgment, if it is, indeed to be a righteous judgment. To propose anything but justice, even-handed and dispassionate justice, to Germany at any time, whatever the outcome of the war, would be to renounce and dishonor our own cause. For we ask nothing that we are not willing to accord.

It has been with this thought that I have sought to learn from those who spoke for Germany, whether it was justice or dominion and the execution of their own will upon the other nations of the world, that the German leaders were seeking. They have answered, answered in unmistakable terms. They have avowed that it was not justice but dominion and the unhindered execution of their own will.

The avowal has not come from Germany's statesmen. It has come from her military leaders, who are her real rulers. Her statesmen have said that they wished peace and were ready to discuss its terms whenever their opponents were willing to sit down at the conference table with them. Her present chancellor has said—in indefinite and uncertain terms, indeed, and in phrases that often seem to deny their own meaning, but with as much plainness as he thought prudent—that he believed that peace should be based upon the principles which we had declared would be our own in the final settlement.

At Brest-Litovsk her civilian delegates spoke in similar terms; professed their desire to conclude a fair peace and accord to the peoples with whose fortunes they were dealing, the right to choose their own allegiances. But action accompanied and followed the profession. Their military masters—the men who act for Germany and exhibit her purpose in execution—proclaimed a very different conclusion.

We cannot mistake what they have done—in Russia, in Finland, in the Ukraine, in Roumania. The real test of their justice and fair play has come. From this we may judge the rest. They are enjoying in Russia a cheap triumph in which no brave, or gallant nation can long take pride. A great people, helpless by their own act, lies for the time at their mercy. Their fair professions are forgotten. They nowhere set up justice, but everywhere impose their power and exploit everything for their own use and aggrandizement; and the peoples of conquered provinces are invited to be free under their dominion!

Are we not justified in believing that they would do the same things at their western front if they were not there face to face with armies whom even their countless divisions cannot overcome? If, when they have felt their check to be final, they should propose favorable and equitable terms, with regard to Belgium, France and Italy, could they blame us if we concluded that they did so only to assure themselves of a free hand in Russia and the East?

Their purpose is undoubtedly to make all the Slavic peoples, all the free and ambitious nations of the Baltic peninsula, all the lands that Turkey has dominated and misruled, subject to their will and ambition, and build upon that dominion an empire of force upon which they fancy that they can then erect an empire of gain and commercial supremacy—an empire as hostile to the Americas as to the Europe which it will overawe—an empire which will ultimately master Persia, India and the peoples of the Far East.

In such a program our ideals, the ideals of justice and humanity and liberty, the principle of the free self-determination of nations upon which all the modern world insists, can play no part. They are rejected for the ideals of power, for the principle that the strong must rule the weak, that trade must follow the flag, whether those to whom it is taken welcome it or not, that the peoples of the world are to be made subject to the patronage and overlordship of those who have the power to enforce it.

That program once carried out, America and all who care or dare to stand with her must arm and prepare themselves to contest the mastery of the world, a mastery in which the rights of common men, the rights of women and of all who are weak, must for the time being be trodden under foot and disregarded, and the old, age-long struggle for freedom and right begin at its beginning. Everything that America has lived for and loved and grown great to vindicate and bring to a glorious realization will have fallen in utter ruin, and the gate of mercy once more pitilessly shut upon mankind!

The thing is preposterous and impossible; and yet is not that what the whole course and action of the German armies has meant wherever they have moved? I do not wish, even in this moment of utter disillusionment, to judge harshly or unrighteously. I judge only what the German arms have accomplished with unpitiful thoroughness throughout every fair region they have touched.

What, then, are we to do? For myself, I am ready, ready still, ready even now, to discuss a fair and just and honest peace at any time that it is sincerely purposed,—a peace in which the strong and the weak shall fare alike. But the answer, when I proposed such a peace, came from the German commanders in Russia, and I cannot mistake the meaning of the answer.

I accept the challenge. I know that you accept it. All the world shall know that you accept it. It shall appear in the utter sacrifice and self-forgetfulness with which we shall give all that we love and all that we have to redeem the world, and make it fit for free men like ourselves to live in.

This now is the meaning of all that we do. Let everything that we say, my fellow countrymen, everything that we henceforth plan and accomplish, ring true to this response till the majesty and might of our concerted power shall fill the thought and utterly defeat the force of those who flout and misprize what we honor and hold dear. Germany has once more said that force, and force alone, shall decide whether justice and peace shall reign in the affairs of men, whether right as America conceives it or dominion as she conceives it shall determine the destinies of mankind.

There is, therefore, but one response possible from us: Force, Force to the utmost, Force without stint or limit, the righteous and triumphant Force which shall make right the law of the world, and cast every selfish dominion down in the dust.

A GERMAN COMMENTARY.—Amsterdam, April 7.—A semi-official statement was issued in Berlin to-day commenting on the speech made by President Wilson at Baltimore, on Saturday night. It says:

"President Wilson turns the historical events upside down. The world knows that the gigantic struggle now being fought in the west is a consequence of the will of the Entente for war.

"President Wilson now calls for force to the utmost, and, in so doing, at last clearly describes the policy of the Americans and their allies; namely: force against everything that opposes them. Germany will not suffer from this yoke of force.

"Mr. Wilson's speech is a propaganda speech for the new American war loan. It is the best possible propaganda for our own loan, since it shows what it would mean for Germany to lose the war."—*N. Y. Times*, 8/4.

GERMANY WANTS FRENCH IRON DISTRICTS.—The Hague, April 10.—There has been a marked change among the German political leaders who passed the famous Reichstag peace resolution, and apparently the Socialist Party as such, has been unable to withstand the pressure of German labor opinion, which for some months has repeatedly given voice to its anger over the unconciliatory spirit of the Entente Powers.

Men who a few months ago would not listen to any annexation plans admit to-day that compensation in some form must be exacted by a "victorious Germany." They justify the change of opinion by reminding the people that Dr. Hertling and Count Czernin have both stated repeatedly that if Germany's peace offers were disregarded by the enemy, the Central Powers would not feel pledged to peace without compensations and annexations.

Much of this change in the public mind has been brought about by the menace of a commercial and industrial war after the world war, and in this respect America's attitude probably has been most effective. The people take it for granted that the Central Powers will end the war victoriously in a military way.

Germany's captains of industry insist that Briey and Longwy, besides a strip of French land wide enough to protect the iron mines from hostile guns in any future war, be incorporated into the German Empire. Borsig, chief of the famous house of August Borsig, writes in the *Vossische Zeitung* that the menace of economical war after the war, as decided on by the Paris conference, has made it imperative for German industry to seek independent sources of raw products.

"The deposits of iron ore in Longwy and Briey," Borsig says, "would make us quite independent of any importation of raw material. We could spare even the Swedish ore. Even if we were to treat France leniently and generously leave her in possession of those districts we have no security that she will serve us likewise.

"The iron industry is a wonderful, great tree in the midst of the field of the German industry. Its roots are the supply of raw products, its trunk, the iron mills and steel works, upon which spread flourishing branches of many-sided industry. During the war it has been very difficult to keep this splendid tree alive, for half its roots extend to foreign countries. This tree has been growing close to the German border line. If we want to secure it we must take enough territory to make sure that in the future its roots need not wander beyond the German frontier."—*N. Y. Times*, 10/4.

RUSSIA'S FATE IN GERMAN HANDS.—The open boast that the entire future of Russia lies in the hands of Germany, to mold as she pleases, is made in the German press. Georg Bernhard, in the Berlin *Vossische Zeitung*, thus views the infinite possibilities of Russia:

"We still hold to the view that there can be no question of permanent chaos and dissolution in Russia. The correctness of this view finds support in the fact that the Ukrainians also do not believe in such a development. Despite all the recent rumors spread in Germany, the Ukrainians are still firm in their resolve to form a federal republic with the rest of Russia after the fall of the Bolshevik régime. If this hope is fulfilled, then all the other Russian republics which have been formed during the Bolshevik era will crystallize round this kernel. Thus there will be a large and powerful Russia for all time. Those who accept this view must reach the logical conclusion not to impose any conditions for future peace such as might permanently cloud the relation between the new Russia and Germany. One may submit to the necessity of military guaranties, but one must unhesitatingly reject any forcible accession of territory in excess of this.

"It is, of course, quite another matter if we adopt the view of many people in Germany, who believe in the permanent break-up of Russia. Then arises the danger of independent frontier states, with which Germany must establish close contact, especially if one believes in the possibility of their being influenced by England. In all this, it is true, one must never overlook the fact that the future fate of Russia, and also the relation of Japan to Russia and Germany lie in our hands. This becomes very clear when we consider the general Peace Congress and the rôle which England will play there. Germany may find very considerable surprises there unless she secures the alliance of the future Russian Government at the green table against England. What enters the Congress Hall we shall know, but who shall prophesy what will finally come out of it?"—*Literary Digest*, 6/4.

COUNT CZERNIN ON PEACE PROSPECTS

Speaking to a deputation of the Vienna City Council on April 2, Count Czernin took opportunity to review the political situation. He declared he had "much too high an opinion of Mr. Wilson's statesmanship" to suppose that Mr. Wilson would attempt to drive a wedge between Vienna

and Berlin. Possibly, however, Mr. Wilson considered Vienna "more favorable soil for sowing the seeds of a general peace." After referring to the "admirable speech" made by the German Chancellor on Mr. Wilson's four peace principles, Count Czernin continued as follows:

"President Wilson's four points are a suitable basis upon which to begin negotiating about a general peace. The question is whether or not Mr. Wilson will succeed in uniting his allies upon this basis.

"God is my witness that we have tried everything possible to avoid a new offensive. The Entente would not have it. A short time before the beginning of the offensive in the west, M. Clemenceau inquired of me whether and upon what basis I was prepared to negotiate. I immediately replied, in agreement with Berlin, that I was ready to negotiate, and that, as regards France, I saw no other obstacle for peace than France's desire for Alsace-Lorraine.

"The reply from Paris was that it was impossible to negotiate on that basis. There was then no choice left.

"The gigantic struggle in the west has already begun. Austro-Hungarian and German troops are fighting shoulder to shoulder as they did in Russia, Serbia, Rumania, and Italy. We are fighting united for the defence of Austria-Hungary and Germany. Our armies will show the Entente that French and Italian aspirations to portions of our territory are Utopias which will be terribly avenged.

"The explanation of this attitude of the Entente Powers, which verges on lunacy, is to a great extent to be sought in certain domestic events here, to which I shall return later. Whatever may happen, we shall not sacrifice German interests any more than Germany will desert us. Loyalty on the Danube is not less than German loyalty. We are not fighting for imperialist or annexationist ends, either for ourselves, or for Germany, but we shall act together to the end for our defence, for our political existence and for our future.

"The first breach in the determination of our enemies to war has been driven by the peace negotiations with Russia. That was a break-through by the idea of peace.

"It is a symptom of childish dilettantism to overlook the close relationship of the various peace signatures with each other. The constellation of enemy powers in the East was like a net. When one mesh was cut through the remaining meshes loosened of their own accord."

Count Czernin then outlined the Rumanian peace terms, explaining that while from Russia he "did not demand a single meter, Rumania neglected the favorable moment." Protection of merchant shipping in the Danube, and guarding of the iron gate was to be secured by an extension of the frontier and leases for certain wharves and islands, while the frontier was advanced from 15 to 18 kilometers elsewhere as military reasons required.

"Rumania's future," the Foreign Minister continued, "lies in the east. Large portions of Bessarabia are inhabited by Rumanians, and there are many indications that the Rumanian population there desires close union with Rumania. If Rumania will adopt a frank, cordial, friendly attitude toward us we will have no objections to meeting those tendencies in Bessarabia. Rumania can gain much more in Bessarabia than she lost in the war."

Count Czernin said that he was anxious that the rectifications of the frontier should not leave any embitterment behind, and expressed the opinion that Rumania in her own interest must turn to the Central Powers.

"In concluding peace with Rumania and Ukraine," he continued, "it has been my first thought to furnish the monarchy with foodstuffs and raw materials. Russia did not come into consideration in this connection owing to the disorganization there.

"We agreed with Ukraine that the quantity of grain to be delivered to the Central Powers should be at least 1,000,000 tons. Thirty cars of grain and peas are now en route, 600 cars are ready to be transported, and these transports will be continued until the imports are organized and can begin regularly. Larger transports are rendered possible by the peace with Rumania, which enables goods to be sent from Odessa to Danube ports.

"We hope during May, to undertake the first large transport from Ukraine. While I admit that the imports from Ukraine are still small and must be increased, nevertheless our food situation would have been considerably worse had this agreement not been concluded.

"From Rumania we will obtain a considerable surplus of last year's harvest. Moreover, about 400,000 tons of grain, peas, beans, and fodder must be transported via the Danube. Rumania must also immediately provide us with 800,000 sheep and pigs, which will improve our meat supply slightly.

"It is clear from this that everything will be done to obtain from the exploitation of the regions, which peace has opened for us in the east, whatever is obtainable. The difficulties of obtaining these supplies from Ukraine are still considerable, as no state of order exists there. But with the good will of the Ukrainian Government and our organization we will succeed in overcoming the difficulties.

"An immediate general peace would not give us further advantages as all Europe to-day is suffering from lack of foodstuffs. While the lack of cargo space prevents other nations from supplying themselves, the granaries of Ukraine and Rumania remain open to the Central Powers."

Replying to the annexationists, Count Czernin said:

"The forcible annexation of foreign peoples would place difficulties in the way of a general peace, and such an extension of territories would not strengthen the empire. On the contrary, considering the grouping of the monarchy, they would weaken us. What we require is not territorial annexations, but economic safeguards for the future.

"We wish to do everything to create in the Balkans a situation of lasting calm. Not until the collapse of Russia did there cease to exist the factor which hitherto made it impossible for us to bring about a definite state of internal peace in the Balkans.

"We know that the desire for peace is very great in Serbia, but Serbia has been prevented by the Entente Powers from concluding it. Bulgaria must receive from Serbia certain districts inhabited by Bulgarians. We, however, have no desire to destroy Serbia. We will enable Serbia to develop, and we would welcome closer economic relations with her.

"We do not desire to influence the future relations between the monarchy and Serbia and Montenegro by motives conflicting with friendly, neighborly relations. The best state of egoism is to come to terms with a beaten neighbor, which leads to this: My egoism regarding Austria-Hungary is that after being conquered militarily our enemies must be conquered morally. Only then is victory complete, and in this respect diplomacy must finish the work of the armies.

"Since I came into office, I have striven only after one aim, namely to secure an honorable peace for the monarchy and to create a situation which will secure to Austria-Hungary future free development, and, moreover, to do everything possible to ensure that this terrible war shall be the last one for time out of mind. I have never spoken differently. I do not intend to go begging for peace, or to obtain it by entreaties or lamentations, but to enforce it by our moral right and physical strength. Any other tactics, I consider, would contribute to the prolongation of the war.

"I must say, to my regret, that during the last few weeks and months much has been spoken and done in Austria that prolongs the war. Those who are prolonging the war are divided into various groups, according to their motives and tactics. There are, firstly, those who continuously beg for peace. They are despicable and foolish. To endeavor to conclude peace

at any price is despicable, for it is unmanly, and it is foolish because it continuously feeds the already dying aggressive spirit of the enemy. The desire for peace of the great masses is natural as well as comprehensible, but the leaders of the people must consider that certain utterances produce abroad just the opposite effect from what they desire.

"Firmly relying on our strength and the justice of our cause, I have already concluded three moderate, but honorable, peace treaties. The rest of our enemies also begin to understand that we have no other desire than to secure the future of the monarchy and of our allies, and that we intend to enforce this, and can and will enforce it. I shall unswervingly prosecute this course and join issue with any one who opposes me.

"The second group of war prolongers are the annexationists. It is a distortion of fact to assert that Germany has made conquests in the East. Lenin's anarchy drove the border people into the arms of Germany. Is Germany to refuse this involuntary choice of foreign border states?

"The German Government has as little desire for oppressions as we, and I am perfectly convinced that neither annexationists nor weaklings can prevent forever a moderate, an honorable peace. They delay it, but they cannot prevent it.

"The hopes of our enemies of final victory are not merely based on military expectations and the blockade. They are based to a great extent on our interior political conditions and on certain political leaders, not forgetting the Czechs. Recently we were almost on the point of entering into negotiations with the Western Powers, when the wind suddenly veered round and, as we know with certainty, the Entente decided it had better wait, as parliamentary and political events in our country justified the hope that the monarchy would soon be defenseless."

Count Czernin attacked the Czech leaders and Czech troops, who, he declared, "criminally fight against their own country," and appealed to the people to be united against this "high treason."

The government, he said, was quite ready to proceed to the revision of the Constitution, but this would not be helped by those who hoped through the victory of the Entente to gain their ends.

"If we expel this poison," he declared, "a general honorable peace is nearer than the public imagines, but no one has the right to remain aside in this last decisive struggle."

PEACE TALK OF LAST SUMMER

Count Czernin's reference, in his speech of April 2, to earlier secret peace negotiations, aroused keen interest both in Berlin and in allied capitals. Asked to explain alleged offers from France, Premier Clemenceau replied briefly that "Czernin lied."

On April 5, an official announcement was made in Vienna to the effect that Count Revertata, counselor of the Austrian legation in Switzerland, had held conversations in February, 1918, with Count Armand, an agent of M. Clemenceau. Count Revertata was instructed to suggest that a general peace was possible provided France renounced Alsace-Lorraine. The reply from M. Clemenceau was unfavorable.

Later statements from Paris on April 6, and Vienna on April 8, brought out that the interviews between the two agents had taken place during June, July, and August, 1917, in Switzerland, and later at Revertata's residence in Freiburg. Neither the fact of the interviews nor the negative result was disputed, but merely the question as to which side had taken the initiative.

As a result of the disclosures, the Emperor Charles of Austria on April 11 sent a message of reassurance to Emperor William, as follows:

"The French Premier, driven into a corner, is endeavoring to escape from the net in which he has entangled himself by piling up more and more untruth, and he does not hesitate to make the completely false statement that I recognized that France had a just claim to the reacquisition of Alsace-Lorraine. I disavow this assertion with indignation.

"At the moment when Austro-Hungarian cannon are thundering jointly with German cannon on the western front, it hardly needs proof that I am fighting for these provinces, and I am ready to continue fighting exactly as if it were a question of defending my own land.

"Although, in face of this eloquent proof and the full community of aims, for which almost four years we have been waging war, I consider it superfluous to waste even a word on Premier Clemenceau's false assertion, I desire, nevertheless, to take this opportunity of again assuring you of the complete solidarity which exists between you and me and your empire and mine.

"No intrigues, no attempts, from whomsoever they may proceed, will imperil our loyal comradeship of arms, and we shall jointly enforce an honorable peace."

EMPEROR CHARLES ON "JUST CLAIMS OF FRANCE."—Following close upon the Emperor's letter to the Kaiser, the French Government on April 11, published the following letter from Charles to Prince Sixtus de Bourbon, the only explanation of which afterward made by Austria was that the letter bearing the Emperor's signature must have been garbled in transmission:

Once caught in the cogwheels of lying, there is no means of stopping. Emperor Charles, under Berlin's eye, is taking on himself the lying denials of Count Czernin, and thus compels the French Government to supply the proof. Herewith is the text of an autograph letter communicated on March 31, 1917, by Prince Sixtus de Bourbon, the Emperor of Austria's brother-in-law, to President Poincaré, and communicated immediately, with the Prince's consent, to the French Premier:

"*My Dear Sixtus:* The end of the third year of this war, which has brought so much mourning and grief into the world, approaches. All the peoples of my empire are more closely united than ever in the common determination to safeguard the integrity of the monarchy at the cost even of the heaviest sacrifices.

"Thanks to their union, with the generous co-operation of all nationalities, my empire and monarchy have succeeded in resisting the gravest assaults for nearly three years. Nobody can question the military advantages secured by my troops, particularly in the Balkans.

"France, on her side, has shown force, resistance, and dashing courage, which are magnificent. We all unreservedly admire the admirable bravery, which is traditional to her army, and the spirit of sacrifice of the entire French people.

"Therefore it is a special pleasure to me to note that, although for the moment adversaries, no real divergence of views or aspirations separates many of my empire from France, and that I am justified in hoping that my keen sympathy for France, joined to that which prevails in the whole monarchy, will forever avoid a return of the state of war, for which no responsibility can fall on me.

"With this in mind, and to show in a definite manner the reality of these feelings, I beg you to convey privately and unofficially to President Poincaré that I will support by every means, and by exerting all my personal influence with my allies, France's just claims regarding Alsace-Lorraine.

"Belgium should be entirely re-established in her sovereignty, retaining entirely her African possessions without prejudice to the compensations she should receive for the losses she has undergone.

"Serbia should be re-established in her sovereignty and, as a pledge of our good-will, we are ready to assure her equitable natural access to the Adriatic, and also wide economic concessions in Austria-Hungary. On her side, we will demand, as principal and essential conditions, that Serbia cease in the future all relation with, and suppress every association or group whose political object aims at the disintegration of the monarchy, particularly the Serbian Political Society, Narodni Ochrana; that Serbia loyally and by every means in her power prevent any kind of political agitation, either in Serbia or beyond her frontiers, in the foregoing direction, and give assurances thereof under the guarantee of the Entente Powers.

"The events in Russia compel me to reserve my ideas with regard to that country until a legal definite government is established there.

"Having thus laid my ideas clearly before you, I would ask you in turn, after consulting with these two powers, to lay before me the opinion of France and England, with a view thus to preparing the ground for an understanding on the basis of which official preliminary negotiations could be taken up and reach a result satisfactory to all.

"Hoping that thus we will soon be able, together, to put a limit to the sufferings of so many millions of men and families now plunged in sadness and anxiety, I beg to assure you of my warmest and most brotherly affection.

CHARLES."

The French note adds:

"Count Czernin, having recognized by his note of April 8, the existence of this negotiation due to the initiative of a personage of 'a rank far above his,' the Austrian Government is now summoned to give an explanation of the 'attempt' avowed by it and of the details of the conversation of its delegates."

RESIGNATION OF COUNT CZERNIN.—Count Czernin, Austro-Hungarian Foreign Minister, resigned on April 15. His resignation was undoubtedly connected with the awkward position in which Austria was placed by the controversy with France, and the publication of the Emperor's letter to Prince Sixtus; evidence indicated that his downfall was forced by Berlin.

BARON BURIAN MADE FOREIGN MINISTER.—Confirmation of the appointment of Baron Burian to succeed Count Czernin, as Austro-Hungarian Foreign Minister, was received by the State Department on April 17.

Baron Stephan Burian von Rajecz was Austro-Hungarian Minister of Foreign Affairs from September 15, 1914, to December 23, 1916, when he was succeeded by Count Czernin, whose place he now takes. Baron Burian has been Finance Minister since Count Czernin has been in the Foreign Office. He took the place of Count Berchtold as Foreign Minister in 1914, and was the author of the notes to the United States on the case of the Italian steamship *Ancona*, sunk in the Mediterranean with the loss of American lives in the fall of 1915.

Burian has been regarded by officials here as more friendly to America in the past than any of the other statesmen of the Dual Monarchy.—*N. Y. Times*, 8/4.

ITALY AND JUGO-SLAVS IN AGREEMENT.—A quiet modification of Italy's war aims has apparently been made, particularly with reference to the Jugo-Slavs. The *New Europe* announces that an agreement has been reached by representatives of the two nations, though it has not yet been ratified in Rome. In February, it was strongly intimated in Prime Minister Orlando's

name that Italy was ready to revise her "finality," as embodied in the secret treaty of 1915, and to adjust herself to "the new and real situation." Powerful Italian newspapers, the *Secolo*, the *Messaggero*, and the *Corriere Della Sera*, advocated this change of front, though the organ of Sonnino, the Foreign Minister, continued to oppose it. The actual result of the controversy and the negotiations must be awaited, but it is interesting to note that the mere report of an accord between Italy and the Jugo-Slavs, led to open advocacy in the Austrian Reichsrat of independence for all Slavs within the Dual Monarchy. And this heightened the demands and kindled the hopes of the Czechs in Bohemia. Here we have a hint of those "domestic matters" on which Count Czernin dwelt with so much concern in his recent Orphic speech in Vienna.—*N. Y. Nation*, 11/4.

GREAT BRITAIN

LLOYD GEORGE'S SPEECH OF APRIL 9.—On April 9, Premier Lloyd George addressed the House of Commons on the crisis in the military situation, announcing the purpose of the government to introduce bills for conscription in Ireland and for putting at the disposal of the government every able-bodied man up to 50, and in some cases 54 years old. The speech dealt fully and frankly with the military situation. Among other points, it was stated that at the outbreak of the March offensive the Germans were slightly inferior to the Allies in all branches of the service, though approximately equal in infantry; that the location, strength and degree of the Amiens attack had been accurately predicted by General Sir Henry Wilson in January; that through the retirement of the 5th army, the situation was at one time very critical; that the consent of America to brigade her battalions with those of the Allies and the decision of the Versailles conference to place General Foch in supreme direction of the strategy of all the Allied armies on the western front, were essential to Allied success.

The part of the Premier's speech dealing with Irish conscription was as follows:

"I now come to the question of Ireland. When an emergency has arisen which makes it necessary to put men of 50 and boys of 18 into the army in the fight for liberty and independence—"

Joseph Devlin here interrupted—"and small nationalities."

The Premier resumed: "Especially, as I am reminded, to fight for liberty and independence and small nationalities, I am perfectly certain it is not possible to justify any longer the exclusion of Ireland."

John Dillon—"You will not get any men from Ireland by compulsion, not a man."

"What is the position?" continued Mr. Lloyd George. "No Home Rule proposal ever submitted in this House proposed to deprive the Imperial Parliament of the power of dealing with all questions in relation to the army and navy. These invariably are in every Home Rule bill I have ever seen and are purely questions for the Imperial Parliament, so that I am no more claiming any national right than was ever claimed in the House. The Defense of the Realm Act also was extended to Ireland."

"The character of the quarrel in which we are engaged is just as much Irish as English. May I say it is more so? It is more Irish, Scotch, and Welsh than it is even English. Ireland, through its representatives at the beginning of the war, assented to it."

Mr. Devlin here interjected—"Because it was a war for small nationalities."

The Prime Minister resuming: "Ireland, through its representatives, assented to the war, voted for the war, supported the war. Irish repre-

sentatives and Ireland, through its representatives, without a dissenting voice committed the empire to this war. They are as responsible for it as any part of the United Kingdom. May I just read the declaration issued by the Irish party on December 17, 1914, shortly after the war began?"

Mr. Byrne interrupted with: "We have had a revolution since then."

The Prime Minister, resuming: "This is the Declaration of the Irish Party: 'A test to search men's souls has arisen. The empire is engaged in the most serious war in history. It is a just war, provoked by the intolerable military despotism of Germany. It is a war for the defence of the sacred rights and liberties of small nations and the respect and enlargement of the great principles of nationality. Involved in it is the fate of France, our kindred country and the chief nation of that powerful Celtic race to which we belong; the fate of Belgium, to whom we are attached by the same great ties of race and by the common desire of small nations to assert their freedom, and the fate of Poland, whose sufferings and struggles bear so marked a resemblance to our own.

"It is a war for the high ideals of human government and international relations, and Ireland would be false to her history and to every consideration of honor, good faith, and self-interest did she not willingly bear her share in its burdens and its sacrifices.'

"May I also refer to a speech delivered by the late John Redmond at Mansion House, Dublin, when he was addressing a recruiting meeting there. He said:

"The heart of Ireland has been profoundly moved by the spectacle of the heroism and sufferings of Belgium. The other day in London, I met Cardinal Archbishop Mercier, and I took the liberty of promising him then that Ireland would bring her arms and her strength to avenge Louvain and to uphold and defend the integrity and independence of Belgium.'

"Belgium, Poland, Alsace-Lorraine, and France. Those are words for the Irish people to think over. There never was a war in which higher and nobler issues were at stake. I have heard some people speak of this war as an English and not an Irish War. That is absolutely and definitely untrue. Ireland's highest imperial interests are at stake.'

"The fact that America is in this war is the best proof. There are more Irishmen in the United States than there are in Ireland. They are all subject to conscription."

Captain W. A. Redmond, son of the late Irish leader, interrupted: "Not by England!"

Mr. Lloyd George resumed: "Irishmen in Great Britain are subject to conscription and so are Irishmen in Canada. Mr. Redmond in addressing this House on the military service bill in 1916, said:

"Let me state what is my personal view of this matter of compulsion. I am content to take the phrase used by the Prime Minister in his last speech, and I am prepared to say that I will stick at nothing which is calculated in order to win this war, and this is the view, I am certain, of the people of Ireland.'

"Then he was opposed to that particular bill. But he said that with him conscription was not a question of principle; it was purely a question of necessity for the raising of men. I think the member for Mayo (Mr. Dillon) took substantially the same view in a speech which he delivered at the same time. The member said:

"We are now engaged in discussing an important political proposal for the country. Like the member for Waterford (Mr. Redmond), I view the thing from the point of necessity and expediency, and in particular circumstances. I would not hesitate to support conscription to-morrow if I thought it was necessary to maintain liberty, and if there was no conscription we ran the risk of losing the war.'

Mr. Dillon interrupted: "That was conditional on Ireland having the liberty to decide her own fate, and if Irish liberty were at stake, I certainly would not hesitate to support conscription."

"I do not want to enter into a controversy as to what my friend meant," continued the Premier, "but that is what he conveyed to the House, and if he will take the trouble to read the speech, he will see that is the case. Mr. Redmond himself, on the third reading, in delivering his speech, put it on the ground that we were fighting for small nationalities."

"He found that was not true," was the interjection of Mr. Devlin.

Mr. Lloyd George went on: "The honorable member never challenged the justice of the war; on the contrary, he supported it, voted for it and supplies, and voted for the declaration of war."

"The Premier is going too far," interrupted Mr. Dillon. "I never challenged the justice of the war; I believed in the justice of the war and said so. I never voted for supplies, nor did any one else in this House, for the vote was never taken. I never challenged the justice of the war and I do not challenge it now. The Premier is going too far when he says that, and most certainly I did vote for the war. I hold very strong opinions about the origin of the war."

"I am satisfied with the statements made by my honorable friend," continued Premier Lloyd George. "He supported the justice of the war. If he believed it was an unjust war he never would have voted for it. May I say so quite respectfully and after a good deal of reflection and hesitation, because, after all, one does not want to propose anything to raise controversy and trouble when, Heaven knows, we have as much trouble as we can possibly deal with. I would not do it unless I thought it was just after great reflection."

"It is indefensible that you should ask young men of 18 years and married men of 35 and 40 with families, and even up to 50, in England, Scotland, and Wales, and that you should compel them to fight for the freedom and independence of a small Catholic nationality in Europe, while the young men of 20 to 25 in Ireland are under no obligation to take up arms for a cause which is just as much theirs as ours. It is not merely illogical, it is unjust."

"There is such a thing as justice for Scotland, England, and Wales, and the emergency which Mr. Redmond contemplated and which I still respectfully suggest the member for Mayo also contemplated, that we should not win this war without taking this measure, has arisen. President Wilson's dramatic decision in the last few days is the best proof, and there is a special emergency with regard to Ireland."

"Irish battalions and divisions, according to all testimony, have maintained the high honor and repute of their native land, and those battalions are sadly depleted and they are now filled, or half filled, with Englishmen. If it were merely England's battle, the young men of Ireland might regard the fact with indifference, but it is not. They are just as much concerned as the young men of England."

"Therefore, we propose to extend the Military Service Act to Ireland, under the same conditions as in Great Britain. As there is no machinery in existence and no register has yet been completed in Ireland, it may take some weeks before actual enrollment begins. As soon as arrangements are complete the government shall by an order in council put the act into immediate operation."

"That is a declaration of war against Ireland," interrupted William O'Brien, Nationalist member for Cork. Michael Flavin, member for Kerry, added: "And Irishmen all over the world."

"Without delay!" replied the Premier, who continued: "Meanwhile, we intend to invite Parliament to pass a measure of self-government for Ireland."

"You can keep it," said Alfred Byrne, Nationalist, for Dublin.

"Let there be no misapprehension. Both questions will not hang together. Each must be taken on its merits," said the Premier.

"You can keep both," replied Mr. Byrne.

"Well," said the Premier, "if that is the view of Home Rule, it is a new view for Ireland."

"While Great Britain is fighting for national rights in Europe with all her reserves and strength she is prepared to concede the same rights in her own sphere of government. The report of the remarkable convention which has been held in Ireland and which has just brought its proceedings to a termination, affords the British Parliament another opportunity of approaching this vexed question with more hope of success."—*New York Times*, 11/4.

COMMONS PASSES MAN POWER BILL.—London, April 16.—The House of Commons to-night rejected John Dillon's motion for the omission of the Irish conscription clause from the Man Power bill by a majority of 176, and finally passed the third reading of the whole bill by 301 to 103, a majority of 198.

London, April 16.—Geogre N. Barnes, Labor member of the War Cabinet without portfolio, announced in the House of Commons to-day that the government intended to introduce a Home Rule bill immediately, and would use every pressure to pass it.

Mr. Barnes also announced that the Lloyd George government would resign if the House of Lords refused to pass the new bill.

Premier Lloyd George, in a speech in the Commons, said:

"It is desirable in the interest of the war that we should settle the Irish question and produce something like contentment in Ireland, and good-will in America."

Mr. Lloyd George said he believed that American opinion supported the Man Power bill, provided that self-government were given to Ireland, and it was of the greatest importance, at the moment America was rendering to the Allies great aid on the battlefield, that Great Britain should satisfy American opinion. Nothing would tend more, he said, to secure the greatest measure of American assistance.—*N. Y. Times*, 17/4.

RESULTS OF IRISH CONVENTION.—On April 9, the report of Sir Horace Plunkett, chairman of the convention on Irish Government that has been in session for the last eight months, was read in the British House of Commons. While not in the proper sense a majority report, the document presented a scheme of government for Ireland which, according to the chairman, was agreed upon by all the Southern Unionists, a majority of the Nationalists, and five out of the seven Labor representatives. The difficulties of the convention were summed up in the two words "Ulster" and "customs," the latter referring to the demand of the Nationalists for full control of customs and excise revenue, to which neither the Ulster Unionists nor the Southern Unionists would agree.

The scheme proposed provides for an Irish Parliament, subordinate to the Parliament of the United Kingdom, the question of fiscal control to be left until after the war.

ALLIED LABOR'S WAR AIMS.—An inter-Allied Labor and Socialist Conference has just concluded its sittings in London, says the *London Clarion*, a Socialist organ, and it drew up a comprehensive memorandum on war aims. It is a modification of the British Labor party's statement of last August, but is significant as it has received the indorsement of the Labor and Socialist organizations in Britain, France, Italy, South Africa, Belgium, and Roumania. It is thus reported:

"The resolution to fight until victory is achieved by which Belgium and the other forcibly annexed peoples are liberated is reaffirmed.

"A League of Nations to prevent wars, democratically founded, is made the basis of peace. The section defining the constitution of the League has been rewritten more clearly and fully. Large powers are claimed for it.

"On Alsace-Lorraine the French Socialist demand is explicitly followed. This involves, first, the disannexation of the territory by Germany; the people then are freely to choose their destiny.

"Similarly, it is now claimed that Servia, Montenegro, Roumania, and all the Balkan territories overrun must be evacuated, and each people given full liberty to settle its own destiny. Slavs in Italian territory and Italians in Slavonian territory must have full liberty of local self-government.

"Absolute independence and unity of Poland are more emphatically demanded.

"No annexation of Livonia, Courland, or Lithuania by Germany is admissible.

"With regard to Austria-Hungary, the Czecho-Slovaks' and the Southern Slavs' right to independence is laid down, and also national independence for peoples which demand it, with freedom to substitute a federation of Danubian States for the Austro-Hungarian Empire.

"The paragraph on tropical Africa has been rewritten. Instead of all tropical Africa being handed to the control of the League of Nations, the conquered colonies are to be specially decided on at the Peace Conference, and those in tropical Africa to be controlled according to international agreement under the League of Nations, with economic equality of treatment for all nations, so that none shall be shut out from raw materials or trade.

"No economic boycott of any country after the war.

"It was decided to send the program of the conference to the enemy countries, and to ask for a reply in the hope of securing the adhesion of the socialists of the Central Empires. A committee was appointed to communicate Labor war aims to the Allied Governments, and to secure a promise that one representative of labor should form part of each government's representation at the Peace Conference."—*Literary Digest*, 6/4.

SEIZURE OF DUTCH SHIPS

On March 20, President Wilson issued a proclamation authorizing the Secretary of the Navy to take over all such vessels of Netherlands registry within the territorial waters of the United States as might be necessary for the prosecution of war on Germany. It was estimated that there were at that time approximately 500,000 tons of these ships in American waters, with an equal amount of tonnage within the jurisdiction of Great Britain and France.

In a statement supplementing the proclamation, President Wilson reviewed the preceding negotiations, and made it clear that he sympathized with Holland's precarious position as a result of Germany's defiant attitude, which made impossible "the meeting of free wills."

DUTCH GOVERNMENT'S PROTEST.—On March 30, the Dutch Government issued a strong protest against the action of the American Government, apparently admitting the legality of the action, but declaring it unjustified on higher grounds. The first part of the statement reads as follows:

"With painful surprise, the government and the whole Dutch nation have taken notice of the Presidential proclamation and the statement of March 20, relative to the seizure of part of the Dutch merchant fleet. The seizure en bloc of a neutral mercantile fleet, if only for the duration of the war, is an act indefensible from the viewpoint of international law and unjustifiable toward a friendly nation, apart from considerations of legality. But the manner, also, in which the Presidential statement defends this act of violence does not contribute toward lessening the sting thereof, for this

defence has plainly been drawn up under the influence of a completely incorrect representation of affairs.

"The manner in which the Dutch merchant fleet has been treated in past months in the United States, the incessant difficulties placed in the way of our sailings from American ports, repeated refusals of bunkering facilities, and forced unloading of cargoes already bought—all this may be within the rights of the United States (save one case, that of the *Zeelandia*, which with her own bunker coal entered an American port and has been unlawfully detained there since), but it surely was against the traditional friendship between the two countries, although on this point the Presidential statement keeps silence."

Here follows a detailed defence of the conduct of the Dutch Government in the protracted negotiations. When on March 7, the Allies insisted that the Dutch ships should be used in transport to France, Holland objected on the ground that "as a neutral country she could not consent to the use of her ships in the danger zone, unless the associated governments could guarantee that the ships would not be armed and would not transport troops or war materials."

SECRETARY LANSING'S REPLY.—On April 12, Secretary of State Lansing replied to the Dutch Protest, pointing out: (1) That the seizure of Dutch ships was entirely legal; (2) that Holland had clearly been prevented by Germany from carrying out her previous agreement; and (3) that the ships were requisitioned only for the period of the war and would be put in a highly lucrative service, all risks being assumed by the United States. The reply follows:

April 13.—"The Netherlands Government have issued a statement relative to the recent action of the government of the United States in putting into its service for the period of the present war emergency certain privately owned vessels of Netherlands registry lying within the territorial jurisdiction of the United States. While this action is referred to as being indefensible from the standpoint of international law, the statement of the Netherlands Government does not argue the question of legality. Nor is this government disposed to do so. The practice of nations and the opinions of jurists on the right of a belligerent to utilize all vessels which come voluntarily and unconditionally within its jurisdiction are sufficiently well known to render citation of precedent and of authority unnecessary. But, as the Netherlands Government themselves suggest, our action must be subjected to a finer test than that of mere legality. It matters very little that our act be legal if, as alleged, it violates traditional friendship and is inconsistent with ideals of right and justice.

"The Netherlands Government first declare that the very presence of Dutch ships in our ports resulted from our detention of them with an unfriendly hand. While our right to refuse bunkers and cargo license is conceded, friendship, it is said, should have led to the granting of special privileges in favor of the subjects of a friendly state. Our own supply of bunker coal at seaboard has been inadequate for our pressing national needs. The cargoes which were demanded were largely of grain, of which our own reserves are all too low. The bunkers, if granted, would have served to carry this grain to the Netherlands where, as events have demonstrated, it was not then needed, and where it would only have served to release equivalent foodstuffs for the enemy. Such action on our part, whatever its intention, would in fact have been an act beneficial to the enemy, and having no relation to our friendship to the Netherlands. The owners of Dutch ships were, however, unwilling that their ships should perform any other services than those which it was clearly impossible for

us to facilitate, and the ships of this maritime nation accordingly lay idle for many months and until the conclusion on January 25, 1918, of the temporary shipping agreement which was proposed by the Netherlands Commissioners at London and accepted by the United States as a measure to restore to immediate activity that portion of the Netherlands mercantile fleet lying within our waters.

"The statement of the Netherlands Government seems to imply that this agreement was in fact lived up to by the Netherlands Government, yet evidence to the contrary is found in the statement itself which refers to German objections as having prevented performance by that government of what is erroneously referred to as America's demand, but what was in reality a Netherlands undertaking, that when a Dutch ship left the United States for the Netherlands a corresponding Dutch vessel should simultaneously leave the Netherlands for the United States. Had not the Netherlands Government, under German threats of violence, which were a matter of common knowledge, felt unable to carry out the temporary shipping agreement, it is inexplicable that the S. S. *Samarinda* and *Adonis* would not have sailed for a Dutch port with their cargoes of foodstuffs, which under the agreement the Netherlands was to receive, and of which it was asserted her people were in direst need. Indeed, the statement of the Netherlands Minister for Foreign Affairs made to Parliament on March 12, 1918, if it is correctly reported to us, sets out in considerable detail Germany's objections, which prevented performance of this shipping agreement. As recently as March 14, 1918, after the Netherlands Government had been informed that the situation had reached a point where the associated governments could see no alternative but requisitioning, a note was presented on behalf of the Netherlands Government expressing the hope that Germany's objections might still be overcome, so as to permit at some future date complete performance of this agreement, which was to have been put into operation immediately and completely upon its conclusion, nearly two months before.

"One year ago, the United States abandoned its neutrality and pledged its entire resources of life and treasure to insure the triumph of democracy over autocracy and to assist to save the world from the blight of militarism. As a result of a species of naval warfare directed against belligerents and neutrals alike, which the Netherlands Government have themselves declared to be illegal, there has during this period existed a shortage of shipping which threatened to postpone at frightful cost the ultimate victory. This has created an emergency which in magnitude and significance has seldom if ever before been equalled. During this period there have been lying in ports of the United States and subject to its jurisdiction and control approximately 500,000 tons of ships of Netherlands registry.

At any time within a year the United States might have exercised its right to put these ships into a service useful to it. Yet it forebore and for many months patiently negotiated, first in Washington and then in London, until finally the temporary agreement of January 25 was entered into. No sooner was this agreement concluded than it broke down under German threats of violence which overruled the will of the Netherlands Government expressed therein. Then and then only did the United States take steps to accomplish through the exercise of its own right that which it was hoped could have been accomplished by agreement, and which the Netherlands Government had been willing in part so to accomplish.

"The action taken leaves available to the Netherlands Government by far the greater part of their merchant marine and tonnage which, according to estimates of their own officials, is ample for the domestic and Colonial needs of the Netherlands. Shipping required for these needs will be free from detention on our part and will be facilitated by the supplying of bunkers. The balance is being put into a highly lucrative service, the owners receiving the remuneration, and the associated governments assuming the risks involved. In order to insure to the Nether-

lands the future enjoyment of her merchant marine intact, not only will ships be returned at the termination of the existing war emergency, but the associated governments have offered to replace in kind rather than in money any vessels which may be lost whether by war or marine risk; 100,000 tons of bread cereal which the German Government when appealed to refused to supply, have been offered to the Netherlands by the associated governments out of their own inadequate supplies, and arrangements are being perfected to tender to the Netherlands Government other commodities which they desire to promote their national welfare, and for which they may freely send their ships.

"The statement of the Netherlands Government explicitly recognizes the traditional friendship of the United States toward their country. It recognizes that we have heretofore sought to act in accordance with the dictates of right and justice and to champion the interests of smaller nations. It should not therefore hastily be presumed that we have now abruptly repudiated that friendship and been false to those ideals. It is, in fact, difficult to believe that such a conclusion could be drawn from this exercise of our rights in a manner which scrupulously safeguards and indeed promotes the national interests of the Netherlands."

JAPANESE-AMERICAN SHIPPING AGREEMENT.—Washington, April 2.—More than 250,000 tons of shipping constructed in Japan, of which 30 vessels averaging 5000 tons each will fly the Japanese flag, soon will be in the transatlantic service carrying troops, food and munitions to France.

In addition to this tonnage, the United States Government has arranged for a new construction in Japan, which will aggregate another 200,000 tons.

All of the vessels, as rapidly as they can be made available, will be armed with guns, provided with gun crews, and all the latest devices to fight the German submarines will be installed on them.

Official announcement already has been made by the War Trade Board of the sale to the United States of 100,000 tons of these vessels, the delivery of which will begin in May and will be completed by September. The government has also made formal announcement concerning negotiations to obtain the 200,000 tons of new construction.

The additional 150,000 tons making up the total of 450,000 tons are to be chartered by the United States, but will remain in the possession of Japan. The 30 vessels are now afloat and it is understood that they can be placed in the Atlantic soon enough to be of great value in supplying the fighting forces of Europe this summer.

In connection with the negotiations for the use of all of the tonnage involved in the transatlantic trade, the United States has agreed to furnish Japan with steel plates so that Japan's building program will not be interrupted. The first shipment of steel plates will total 100,000 tons, sufficient for the construction of 300,000 tons of shipping.

ALLIED FORCES IN VLADIVOSTOK

According to a despatch dated April 5 from the U. S. Consul at Vladivostok, a small armed force was on that date landed from Japanese cruisers in the harbor. "This action," according to the announcement, "was taken following an invasion of a Japanese office by five armed Russians, who, upon being refused money, opened fire, killing one Japanese and wounding two others."

Advices from Moscow on April 6, stated that British as well as Japanese forces had been landed. The Moscow Government announced that political steps would be taken and that the Soviets of Siberia had been ordered to offer armed resistance to enemy incursions.

London, April 8.—Official telegrams from Tokio, say that the landing of Japanese and British forces at Vladivostok was a purely local affair, and has no relation to any Japanese intervention in Siberia. The landing followed the pillaging on Thursday of Japanese business houses, during which three Japanese were killed. The police do not maintain order in the city, but on the contrary the local militia invites trouble.

A Reuter dispatch from Moscow says the Japanese diplomatic mission has issued a statement, guaranteeing that the landing of Japanese forces at Vladivostok is purely a local incident, and declaring that its object will soon be fulfilled.

Vladivostok, Monday, April 1 (Associated Press).—Radical Bolsheviks are steadily arriving from Irkutsk and Blagovieshtensk, sometimes accompanied by armed Austrian prisoners, with the avowed purpose of forcing the local Bolsheviks to adopt harsher measures. This has resulted in the seizure of the Russian volunteer fleet, and the occupation of post offices and telegraph offices.

SOUTH AMERICA

URUGUAY PUZZLED.—Montevideo, April 12.—The government of Uruguay has asked Berlin, through Switzerland, if Germany considers that a state of war exists with Uruguay, as stated by the commander of a submarine who captured a Uruguayan military commission bound for France.

If the reply is in the affirmative Uruguay will declare a state of war. If a negative reply is received, Uruguay will demand that the commissioners be liberated on parole.

The above dispatch indicates that a German submarine captured a Uruguayan mission to France. This is the first intimation that such an incident had occurred—*N. Y. Times*, 4/13.

FINANCIAL STATISTICS

U. S. WAR EXPENDITURES AND TAXATION.—Interesting figures were recently published by the Treasury Department, covering expenditures for the month of March, and for the first nine months of this fiscal year. On this basis, the *N. Y. Evening Post* estimates that the total expenditures for the full year ending July 1, 1918, will be about \$12,200,000,000, which is six and one-half billion smaller than the government estimate of last December.

Of this sum, the amount actually expended for war purposes, exclusive of loans, has been something over \$4,600,000,000 for the nine months ending March 31, which is only one-third of the amount estimated for the full year. This difference is at least partly accounted for by the fact that the country's capacity for production has not equaled the assumptions when the appropriations were made.

On the other hand, the yield of the new war taxes has been considerably underestimated. Even on the estimates made last October, the United States, on the basis of the expenditures estimated above, will be meeting 45 per cent of her war-time expenditures by taxation, as compared with 20 per cent in England, 16 per cent in France and Italy, and 10 to 11 per cent in Germany. And if the revenue should be even \$500,000,000 greater than the estimates, the taxpayers would be providing over 50 per cent of war expenditures. This is a proportion unprecedented in past wars.

DEBTS OF WARRING POWERS.—Three and one-half years of war have placed the eight chief belligerents just \$137,404,000,000 in debt. More than two-thirds of this total public debt is charged to Great Britain, France, Italy, Russia, and the United States.

Official figures made public yesterday by the federal reserve board show the allied countries with an aggregate public debt of \$92,978,000,000, as against \$44,426,000,000 charged against the governments of Germany, Austria and Hungary. Great Britain, without her colonies, is most heavily indebted, with Germany and Russia close behind.

FIGURES IN DETAIL.—The detailed figures follow:

ALLIED POWERS

Great Britain	\$27,636,000,000
Australia	942,000,000
Canada	1,011,000,000
New Zealand	611,000,000
South Africa	734,000,000
France	22,227,000,000
Russia	25,383,000,000
United States	7,758,000,000
Italy	6,676,000,000
Total	<u>\$92,978,000,000</u>

CENTRAL POWERS

Germany	\$25,408,000,000
Austria	13,314,000,000
Hungary	5,704,000,000
Total	<u>\$44,426,000,000</u>

The financial position of the Allies as a group is far stronger than that of the Central Powers, however. All the Allies except Russia and Italy, show a higher percentage of gold and silver deposits against their notes than any of the Central Powers. Federal reserve board figures show the United States as the strongest power, with gold and silver amounting to 61.7 per cent of her note and deposit liabilities. Japan ranks second, with 46.6 per cent.

ENGLISH PERCENTAGE 27.5

Great Britain is strongest of the countries in the war from the start. She has gold and silver amounting to 27.5 per cent of her liabilities in notes, and France has 13.7 per cent, with Italy third, at 11.5 per cent. Russian figures show 6.8 per cent.

Germany has gold and silver amounting to 13.3 per cent of her paper liabilities, while Austria is virtually bankrupt, with 1.1 per cent. In other words, the Austrian Government is doing \$100 worth of business on every gold or silver dollar she can muster.—*Washington Post*, 16/4.

REVIEW OF BOOKS

ON

SUBJECTS OF PROFESSIONAL INTEREST

"A Survey of International Relations between the United States and Germany, August 1, 1914-April 6, 1917." Based on Official Documents. By James Brown Scott. \$5.00. (New York: Oxford University Press, 1917.)

It should be understood that this is one of three volumes, each separate and distinct from the others, but of the same format, edited by the same author, and intended to be used together. The second book is "The Diplomatic Correspondence between the United States and Germany: August 1, 1914-April 6, 1917"; the third is "President Wilson's Foreign Policy: A Collection of the President's Addresses, Messages, and Papers on Foreign Policy."

The author, James Brown Scott, has been recognized for some years as the foremost authority on international law in the United States. Now that his three definitive books have been published, a brief biography is in order. A lawyer and an educator, he was graduated from Harvard in 1890. After taking his Master's degree in 1891, and being appointed to a Parker Fellowship, he specialized in international law, 1891-1894, at Berlin, Heidelberg, and Paris. In 1894, he received the degree of Doctor of Jurisprudence of the University of Heidelberg. Returning to the United States, he founded and became the dean of the law school of the University of Southern California, and he was subsequently dean of the College of Law of the University of Illinois; professor of law in the Columbia Law School; at the University of Chicago; and at George Washington University, where, in 1906, he became professor of international law. From 1906 to 1911, he was also solicitor for the state department. Posts of honor in the service of the government have been as follows: technical delegate and expert in international law of the United States at the second Peace Conference at The Hague, 1907; counsel for the United States in the North Atlantic Fisheries Arbitration at The Hague, 1910; at the outbreak of war in 1914, special advisor to the Department of State; and in 1917, Major and Judge Advocate, United States Reserves. He was chairman of the State and Navy Departments Neutrality Board; lecturer on international law at Johns Hopkins University. Secretary of the Carnegie Endowment for International Peace, delegate to the second Pan-American Scientific Congress, editor-in-chief of the American Journal of International Law, and President of the American Institute of International Law, his training, his experience, his achievements in diplomacy, and the technical advice he has given in grave questions affecting the relations between the United States and Germany, as well as the importance of the positions he has occupied, constitute a valid basis for assuming that he is the supreme

authority on the subjects treated in the three volumes. Finally, it is pleasant to record the fact that the royalties due to Dr. Scott will be presented to the Department of State War Relief Work Committee. To those who have met the author this is no surprise, but a confirmation of the high regard in which he is held. To his judicial temperament and calm reasoning, which have made his arraignment of Germany more impressive than any amount of bitter invective, has been added the last touch of disinterestedness.

The arrangement of material in "A Survey of International Relations between the United States and Germany" is logical. The Introduction contains first, without comment, President Wilson's Address to the Congress, April 2, 1917, followed by the Joint Resolution declaring a state of war to exist between the United States and the Imperial German Government, April 6, 1917. The third division of the Introduction is devoted to "German Conceptions of the State, International Policy, and International Law." The reader here finds, for 93 pages, a closely knit structure of quotation and comment, with constant references to the originals, which covers the writings and utterances of Frederick the Great, Hegel, von Clausewitz, Arndt, Frederick William IV, Mommsen, Bismarck, von Moltke, Lasson, Rümelin, Treitschke, the *Kriegsbrauch im Landkriege*, von Bernhardt, Bethmann-Hollweg, and William II. Perhaps no other writer has selected the significant essentials of this field of opinion and doctrine more wisely, made them fit more compactly into an integral whole, or given such convincing evidence that the editing is just and virtually final. Compared with similar summaries, it is noteworthy for the omission of many familiar quotations, and the inclusion of matter that is usually overlooked.

The method of the main part of the book—19 chapters—is constantly to reinforce the author's accuracy in narrative, or his soundness of view, by footnotes which contain not only references but bibliographies, by giving the text of documents in full—in a word, never avoiding any issue, or leaving any stone unturned to present the truth, no fact unsupported, no claim of the defendant minimized or slurred over. Future attempts of German scholars to find flaws in this presentation of the case of the United States will certainly be worth watching.

In order, Dr. Scott considers the genesis of the war, the neutrality of the United States, German charges of unneutral conduct, and the censorship of communications. All German charges are answered categorically. In view of policies put in force by the United States since its entry into the war, conflicts between American and British opinion, now seen in retrospect, with all the evidence and law reviewed, give two clear impressions, (1) that the government of the United States "leaned over backward" in maintaining the strictest neutrality; (2) that in every important discussion, the British Government found decisions of the United States Supreme Court to warrant the principles if not the details of international law upon which Great Britain has acted. In justice to both the British and the American governments, it should now be realized that the former was, under the circumstances, more than fair in its application of principles, that the latter was more than strict, and that the concrete

result was a situation lasting over two years which tended to injure the rightful interests of Great Britain, and also to increase the burden of war, to which the United States later became committed. In other words, the actual effect of the whole controversy concerning neutrality and blockade, as it worked out in terms of adjustment in the application of international law, was to the benefit of Germany. To prove that Germany was treated unfairly would necessitate proof that the body of international law as it existed prior to the outbreak of war was in itself unfair.

In order to treat every aspect of the subject, Dr. Scott was of course obliged to consider questions of widely varying importance. For those who have not seen the volume, it should be outlined. After the chapter on censorship there are treated in order: Unlawful seizure of persons upon the high seas; restraints on commerce; sale of munitions of war; miscellaneous complaints (the sale of dum dum bullets, failure to protest against modification of the Declaration of London, etc.); submarine warfare (the *Lusitania*, the *Arabic*, and the *Sussex*); reprisals, retaliation, necessity; belligerent use of neutral flags; mines, war zones, and blockade; status of merchant vessels; the accepted rules of maritime warfare; renewal of submarine warfare; severance of diplomatic relations and proclamation of armed neutrality. The concluding chapters deal with the declaration of war, with the question "Why not arbitration?" and with the freedom of the seas; and a post scriptum quotes the texts of documents from the President's reply to the Pope's peace appeal to the declaration of war with the Imperial and Royal Austro-Hungarian Government.

From the welter of details, the intricacies or the plain bluntness of international law involved, the differences in the interpretation of the same principle or sanction, there emerges, when one has finished reading 379 pages, certain clear impressions, and solid conclusions: first, that whatever faults may be found with the sincerity or the justice of the cases of Great Britain and the United States, even in the aggregate they weigh as nothing against any one of many of the single crimes and falsehoods of the Imperial German Government; secondly, that the watchword of the British Government in its conduct of war might well have been "a decent respect for the opinions of mankind"; thirdly, that the government of the United States was, against its own best interests in the future at times, almost incredibly patient. If there is anything for Americans to regret in the whole record, it is the cases in which our government made strong objection to British policies which we have since not only carried out ourselves, but exceeded in practical completeness, and the cases in which we took at face value statements of the German Government, which were cynically false. It is possible that in a few minor cases we restrained England from actions which she might better have avoided; it is probable that we did very much toward delaying the full unmasked frightfulness of German warfare on the sea; it is certain, "as God gives us to see the right," that we acted in accordance with that "true honor and dignity of the nation," which, as Gallatin said, "are inseparable from justice." We were not only "good" to Germany, but, almost to our disastrous undoing, we were "unco guid."

H. C. WASHBURN.

"The Virgin Islands of the United States of America." By Luther K. Zabriskie, formerly vice-consul at St. Thomas. 339 pages, 109 illustrations, and 2 maps. Price \$4.00. (New York: G. P. Putnam's Sons, 1918.)

Those who seek concise, well-organized information about our new island possessions will prefer books of a less popular character than this one. For instance, Westegaard's *Danish West Indies* covers the early history more thoroughly; the report recently issued by the U. S. Bureau of Foreign and Domestic Commerce supplies the best data on trade and resources; and the harbor of St. Thomas is well described in an article by Lieut. Commander Byron McCandless, Naval Institute PROCEEDINGS, September-October, 1916. On the other hand, Mr. Zabriskie writes with the familiarity of an old resident, gives a pleasant account of life in town and country and the character, industries, and interests of the people, and takes up a variety of matters not treated in more systematic handbooks.

The population of the Danish West Indies, according to the census of 1911, was in round numbers 27,000, divided as follows: St. Croix, 15,500; St. Thomas, 10,700; St. John, 900. About seven per cent are of unmixed white blood. English has long been the language in general use. Since 1835 the population has fallen off about 16,000, corresponding to the gradual decline in commercial importance.

In the struggles of France, England, and Spain, and later during our Civil War, the port of Charlotte Amalie in St. Thomas prospered as a resort for belligerent vessels and a safe neutral entrepôt for trade between Europe and the West Indies. After 1870, however, both Great Britain and France shifted their trading bases to their own colonies, and the more recent enterprises of the Hamburg-American Line ceased with the outbreak of the present war.

The total imports for the year ending March 31, 1917, amounted to about \$967,000. Of the imports of St. Thomas alone, amounting to \$734,860, the share of the United States was \$332,286, and the rest fell in much smaller portions to the West Indies, England, France, and Holland. In the last year before the war, out of a total of \$980,500, the share of the United States was \$553,000 (\$253,000 in bunker coal for Germany), and that of Germany \$55,000. No satisfactory figures are given for exports, which consist chiefly of sugar and bay rum. In 1916, about \$200,000 worth of sugar was shipped to the United States.

All local expenses—for police, schools, roads, etc.—are met by local taxation and customs. The total cost of the colony to Denmark (including *gendarmery*, \$74,000, and the rest chiefly salaries, pensions, etc.) was in 1916, \$142,000, of which only \$14,500 was raised in the islands.

In 1866, when she was in hard straits after the war with Prussia, Denmark was quite willing to sell her colony for \$7,500,000; but the deal fell through owing to opposition in the U. S. Senate to every policy of the Johnson administration. Two later treaties, in 1898 and 1902, were defeated in the Danish Upper House, as a result, it has been thought, of German influence. The price then set was \$5,000,000. The convention drawn up in 1916 was approved by a Danish plebiscite, December 22, 1916; the transfer was completed March 17, 1917; and the American governor, Rear Admiral James H. Oliver, assumed office on April 7 following. About

one-fourth of Mr. Zabriskie's book is taken up with the interesting ceremonies at the time when the islands changed hands. A. F. W.

"Jane's Fighting Ships, 1917." (20th Edition.) Edited by Maurice Prendergrast. 25s. net. (London and Edinburgh: Sampson Low, Marston and Co., Ltd.)

In this publication, the fighting ships of maritime nations are described by photos, views and general data. The navies are taken up in order of their numerical strength; the descriptions are preceded by illustrations of flags and naval insignia, general notes concerning personnel, silhouettes, and reproductions of charts of important drydocks and naval harbors. In this edition the photos and views of British and U. S. ships are omitted, as well as the customary article on engineering; new data, since entrance into the war of those nations concerned, are practically confined to those given out in official statements; the data of several navies, notably that of Japan, have been revised by naval officers or officials connected with the marine. Several photos of enemy submarines are given.

To those who have recently entered the service "Jane's Fighting Ships" merits considerable study. G. B. K.

"Engineering Descriptive Geometry." By Captain Frank W. Bartlett, U. S. N., and Professor of Mathematics Theodore W. Johnson, U. S. N.

This book, written for the use of Midshipmen at the U. S. Naval Academy, is divided into three natural parts, Line Drawing, Engineering Descriptive Geometry, and Engineering Drawing. These parts are issued separately or bound in one volume as desired.

Part I, Line Drawing, treats of the drawing instruments and the manner of using them to produce all the varieties of lines used in engineering drawing and the lettering suited to the subject. The attention is fixed on the methods of manipulating the instruments and the means of acquiring manual dexterity.

Part II, Engineering Descriptive Geometry, is a treatise on Descriptive Geometry as the basis of Mechanical Drawing, explaining geometrically the operations customary in the drafting room. The authors have wisely treated the subject from a strictly engineering point of view rather than from a mathematical one. They have made the subject more "descriptive" and less "geometrical."

Part III, Engineering Drawing, is arranged as a complete text-book on engineering or mechanical drawing and is suited to the needs of engineering students who have a knowledge of Line Drawing and of the principles of Descriptive Geometry. Use is made of orthographic projections as applied to engineering drawing. The author of this part, Professor Johnson, has also included the recognized conventional abbreviations used in practice and some tables of standards. Naval practice is followed where possible.

The text-book is especially arranged to facilitate self-instruction. It is therefore equally valuable outside of the Naval Academy and will be found very helpful to the unformed man or to the civilian seeking promotion. C. P. B.

NOTICE

The U. S. Naval Institute was established in 1873, having for its object the advancement of professional and scientific knowledge in the Navy. It is now in its forty-fifth year of existence, trusting as heretofore for its support to the officers and friends of the Navy. The members of the Board of Control cordially invite the co-operation and aid of their brother officers and others interested in the Navy, in furtherance of the aims of the Institute, by the contribution of papers and communications upon subjects of interest to the naval profession, as well as by personal support and influence.

On the subject of membership the Constitution reads as follows:

ARTICLE VII

Sec. 1. The Institute shall consist of regular, life, honorary and associate members.

Sec. 2. Officers of the Navy, Marine Corps, and all civil officers attached to the Naval Service, shall be entitled to become regular or life members, without ballot, on payment of dues or fees to the Secretary and Treasurer. Members who resign from the Navy subsequent to joining the Institute will be regarded as belonging to the class described in this Section.

Sec. 3. The Prize Essayist of each year shall be a life member without payment of fee.

Sec. 4. Honorary members shall be selected from distinguished Naval and Military Officers, and from eminent men of learning in civil life. The Secretary of the Navy shall be, *ex officio*, an honorary member. Their number shall not exceed thirty (30). Nominations for honorary members must be favorably reported by the Board of Control. To be declared elected, they must receive the affirmative vote of three-quarters of the members represented at regular or stated meetings, either in person or by proxy.

Sec. 5. Associate members shall be elected from Officers of the Army, Revenue Cutter Service, foreign officers of the Naval and Military professions, and from persons in civil life who may be interested in the purposes of the Institute.

Sec. 6. Those entitled to become associate members may be elected life members, provided that the number not officially connected with the Navy and Marine Corps shall not at any time exceed one hundred (100).

Sec. 7. Associate members and life members, other than those entitled to regular membership, shall be elected as follows: "Nominations shall be made in writing to the Secretary and Treasurer, with the name of the member making them, and such nominations shall be submitted to the Board of Control. The Board of Control will at each regular meeting ballot on the nominations submitted for election, and nominees receiving a majority of the votes of the board membership shall be considered elected to membership in the United States Naval Institute."

Sec. 8. The annual dues for regular and associate members shall be two dollars and fifty cents, all of which shall be for a year's subscription to the UNITED STATES NAVAL INSTITUTE PROCEEDINGS, payable upon joining the Institute, and upon the first day of each succeeding January. The fee for life membership shall be forty dollars, but if any regular or associate member has paid his dues for the year in which he wishes to be transferred to life membership, or has paid his dues for any future year or years, the amount so paid shall be deducted from the fee for life membership.

ARTICLE X

Sec. 2. One copy of the PROCEEDINGS, when published, shall be furnished to each regular and associate member (in return for dues paid), to each life member (in return for life membership fee paid), to honorary members, to each corresponding society of the Institute, and to such libraries and periodicals as may be determined upon by the Board of Control.

The PROCEEDINGS are published monthly; subscription for non-members, \$3.00; enlisted men, U. S. Navy, \$2.50. Single copies, by purchase, 30 cents; issues preceding January, 1918, 50 cents.

All letters should be addressed U. S. Naval Institute, Annapolis, Md., and all checks, drafts, and money orders should be made payable to the same.

SPECIAL NOTICE

NAVAL INSTITUTE PRIZE ESSAY, 1919

A prize of two hundred dollars, with a gold medal, and a life-membership (unless the author is already a life member) in the Institute, is offered by the Naval Institute for the best essay on any subject pertaining to the naval profession published in the PROCEEDINGS during the current year. The prize will be in addition to the author's compensation paid upon publication of the essay.

On the opposite page are given suggested topics. Essays are not limited to these topics and no additional weight will be given an essay in awarding the prize because it is written on one of these suggested topics over one written on any subject pertaining to the naval profession.

The following rules will govern this competition:

1. All essays published in the PROCEEDINGS during 1918, which are deemed by the Board of Control to be of sufficient merit, will be passed upon by the Board during the month of January, 1919, and the award for the prize will be made by the Board of Control, voting by ballot.

2. No essay received after November 1 will be available for publication in 1918. Essays received subsequent to November 1, if accepted, will be published as soon as practicable thereafter.

3. If, in the opinion of the Board of Control, the best essay published during 1918 is not of sufficient merit to be awarded the prize, it may receive "Honorable Mention," or such other distinction as the Board may decide.

4. In case one or more essays receive "Honorable Mention," the writers thereof will receive a minimum prize of seventy-five dollars and a life-membership (unless the author is already a life member) in the Institute, the actual amounts of the awards to be decided by the Board of Control in each case.

5. Essays are limited to fifty (50) printed pages in the PROCEEDINGS of the Institute.

6. It is requested that all essays be submitted typewritten and in duplicate; essays submitted written in longhand and in single copy will, however, receive equal consideration.

7. In the event of the prize being awarded to the winner of a previous year, a gold clasp, suitably engraved, will be given in lieu of the gold medal.

By direction of the Board of Control.

G. M. RAVENSCROFT,
Lieut. Commander, U. S. N., Secretary and Treasurer.

TOPICS FOR ESSAYS

SUGGESTED BY REQUEST OF THE BOARD OF CONTROL

- "Duties and responsibilities of subordinates with special reference to the relations between Commanders in Chief and Chief of Naval Operations; Commanders in Chief and Force Commanders; Force Commanders and Division Commanders."
- "Initiative of the subordinate—its true meaning."
- "Military efficiency dependent upon national discipline."
- "Governmental organization for war."
- "Naval Gunnery, now and of the future."
- "Naval Policies."
- "The place of the Naval Officer in International Affairs."

LIST OF PRIZE ESSAYS

"WHAT THE NAVY HAS BEEN THINKING ABOUT"

1879

Naval Education. Prize Essay, 1879. By Lieut. Commander A. D. Brown, U. S. N.

NAVAL EDUCATION. First Honorable Mention. By Lieut. Commander C. F. Goodrich, U. S. N.

NAVAL EDUCATION. Second Honorable Mention. By Commander A. T. Mahan, U. S. N.

1880

"The Naval Policy of the United States." Prize Essay, 1880. By Lieutenant Charles Belknap, U. S. N.

1881

The Type of (I) Armored Vessel, (II) Cruiser Best Suited to the Present Needs of the United States. Prize Essay, 1881. By Lieutenant E. W. Very, U. S. N.

SECOND PRIZE ESSAY, 1881. By Lieutenant Seaton Schroeder, U. S. N.

1882

Our Merchant Marine: The Causes of Its Decline and the Means to Be Taken for Its Revival. "Nil clarius aquis." Prize Essay, 1882. By Lieutenant J. D. Kelley, U. S. N.

"MAIS IL FAUT CULTIVER NOTRE JARDIN." Honorable Mention. By Master C. G. Calkins, U. S. N.

"SPERO MELIORA." Honorable Mention. By Lieut. Commander F. E. Chadwick, U. S. N.

"CAUSA LATET: VIS EST NOTISSIMA." Honorable Mention. By Lieutenant R. Wainwright, U. S. N.

1883

How May the Sphere of Usefulness of Naval Officers Be Extended in Time of Peace with Advantage to the Country and the Naval Service?

"Pour encourager les Autres." Prize Essay, 1883. By Lieutenant Carlos G. Calkins, U. S. N.

"SEMPER PARATUS." First Honorable Mention. By Commander N. H. Farquhar, U. S. N.

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"SANTA BARBARA."

PATRONESS OF THE NAVAL BUREAU OF ORDNANCE.

**This print was presented by Commander W. M. Folger, U. S. N.,
Chief of Bureau of Ordnance, 1890.**

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SANTA BARBARA

THE PATRONESS OF THE NAVAL BUREAU OF ORDNANCE

By REAR ADMIRAL RALPH EARLE, U. S. Navy

In the office of the chief of naval ordnance, at Washington, D. C., there hangs a handsome portrait of Santa Barbara, the patron saint of ordnance, which was presented to the bureau by Rear Admiral William M. Folger, U. S. N., chief of the bureau from February, 1890, to January, 1893.

Many inquiries as to why the picture is displayed so prominently and as to what it means are made by visitors, both officers and civilians. The search for the real legend was not as simple as had been thought. Believing, therefore, that the result of such an inquiry may be of interest to the service, the bureau asked Mr. Alan S. Hawkesworth, F. R. S. A., to write the story of the beautiful Saint Barbara. Her tragic and short life is set forth by him as follows:

In the Roman, the Greek, and the Russian calendars, the feast-day of "Saint Barbara, Virgin and Martyr," is celebrated on December 4, the presumed anniversary of her martyrdom. The details of her legendary life and death, which are acknowledged to be mythical, are given by the Bellandists, and other authorities.

She is said to have lived at the close of the third and beginning of the fourth century, and to have paid for her faith by her life during the great Diocletian persecution, in 306 A. D., although the

very first mention of her story is in the Frankish Martyrologies of the seventh century. Earlier church historians and martyrologists, who lived nearer in time and in place to the supposed martyrdom, know nothing of the tale, which owes its origin to the romantic imagination of a people of a wholly different race, age, and country, living 400 years after its supposed date, and weaving a "geste" filled with familiar features of folk- and fairy-tale.

No agreement, even, is reached as to the city of her death, nor the Roman emperor in whose reign she suffered. Heliopolis in Egypt (On), or in Coelo-Syria (Baalbek), Nicomedia, Antioch, and Rome, were all, in turn, chosen as being the city. Maximinus, Maximianus, or Galerius, was named as the reigning emperor.

The date of December 16, first chosen as the feast-day anniversary of her martyrdom, was later shifted to the 4th, upon which date it is now held.

Now if, as one version goes, she died in Nicomedia in 235 or 237 A. D., and was a disciple of Origen, then Maximinus, the gigantic Thracian (235-238 A. D.), is the emperor intended. While those versions that chose Heliopolis as the place, and 306 A. D. as the date, evidently mean either Maximianus (286 A. D.), or Maximinus Galerius Daza (308-313 A. D.), two of the numerous Co-Cæsars under Diocletian. But with such an evident romance, any questionings as to the exact date and exact emperor are surely idle.

This, then, is the tale:

Born the daughter of a wealthy heathen named Dioscorus, she grew to maidenhood so incomparably beautiful that her father shut her up in a high tower for safe-keeping. Guarded by her virtue even more than by her tower she studied deeply in philosophy until she grew to be as surpassing in learning and character as she was in loveliness. Suitors, rich and powerful, were all declined and her father was well content. But her studies and thoughts soon led her to see the folly of heathenism, and secretly she became a Christian.

Her father, departing on a long journey, gave orders as he left that a splendid bath-house should be built for her entertainment near her guarding tower. During the erection of this she overpersuaded the masons to disregard her father's strict orders and to place *three* windows therein, instead of the two he had planned. On his return he demanded an explanation, which she gave by

saying that the three windows were to remind her of the Triune God.

Upon her father thus discovering that she was a Christian, his inhuman rage knew no bounds. He beat and starved and shamefully abused her until, in despair, she fled into the surrounding desert, hiding herself there in a deep cavern, and being fed by two shepherds upon the milk of their flocks.

Furiously searching in her track came her brutal father. To his angry demand for his daughter one shepherd pleaded total ignorance. But the other, while vowing with his lips that he also knew nothing, yet slyly pointed with his thumb to the cavern where poor Barbara lay trembling, for which black treachery, in instant punishment, he and his whole flock were turned into stones that very moment.

The infuriated father haled Barbara off to the Governor of the Province, Marcian, or Martianus, and denounced her as one of the hated Christians. After cruel tortures, she was condemned to be beheaded, and her inhuman father himself acted as her executioner.

But chastisement for such monstrous conduct was not long delayed, for, on his way home from committing the foul deed, he was struck by lightning and wholly consumed. Ever since this exemplary vengeance Saint Barbara has been considered by the populace as their protectress against thunder, lightning and explosive flame of all kinds, becoming thus, by an easy analogy, when gunpowder appeared, the patron saint of cannoneers and ordnance men generally.

The cannoneers of Lille in France, who were commissioned under "Royal Letters Patent" in 1417 as the "Confrères de Sainte Barbe," were among the first to do this. Their example was speedily followed all through France, Italy, Germany and European countries generally, so that to this day, and in France especially, she is universally held to be the ordnance saint.

At Rome, libraries and orphanages were considered to be specially under her care; perhaps because they were peculiarly liable to disastrous fires; while on her feast-day, December 4, a solemn military mass was celebrated in her honor, in the Church of S. Maria Transpontine, after which cannon were fired in jubilation.

In art she is pictured standing by her three-windowed tower and holding in her hands the palm of her martyrdom, or sometimes a chalice and sacramental wafer, while cannon are displayed at her feet.

Descriptions of her cult, in modern times, were written by Celestin, "*Histoire de S. Barbe*" (Paris, 1853); Villemot, "*Histoire de S. Barbe, Vierge et Martyre*" (Paris, 1865); and Peine, "*St. Barbara die Schutz Heilige der Bergleute und der Artillerie, und ihre Darstellung in der Kunst*" (Freiberg, 1896).





COMMANDER G. N. HOLLINS, U. S. N.

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THE NAVY AND FILIBUSTERING IN THE FIFTIES

(CONTINUED)

By LOUIS N. FEIPEL

III. THE BOMBARDMENT OF GREYTOWN, NICARAGUA, 1854

In 1855, the scene of American filibustering shifted to Central America, and in particular to the republic of Nicaragua. Events had been leading up to this ever since the year 1848. A few days after the conclusion of the treaty of Guadalupe Hidalgo, by which the United States became the rightful owners of California, and thus invested with augmented special interest in the political condition of Central America, the American Government learned that a military expedition, under the authority of the British Government, had landed at Greytown (or San Juan del Norte, as it was then called), in the state of Nicaragua, and taken forcible possession of that port, which was the necessary terminus of any canal or railway to be constructed across the isthmus within the territories of Nicaragua. It did not diminish the unwelcome-ness to us of this act on the part of Great Britain to find that she assumed to justify it on the ground of an alleged protectorship of a small and obscure band of uncivilized Indians, whose proper name even had become lost to history, who did not constitute a state capable of territorial sovereignty, either in fact or of right, and all political interest in whom, and in the territory they occupied, Great Britain had previously renounced by successive treaties with Spain, when Spain was sovereign of the country, and subsequently with independent Spanish America.

Nevertheless, and injuriously affected as the United States conceived itself to be by this act of the British Government, and by its occupation about the same time of insular and of continental portions of the territory of Honduras, we remembered the many

and powerful ties and mutual interests by which Great Britain and the United States were associated, and we proceeded in earnest good faith, and with a sincere desire to do whatever might strengthen the bonds of peace between us, to negotiate with Great Britain a convention to assure the perfect neutrality of all inter-oceanic communications across the isthmus, and, as the indispensable condition of such neutrality, the absolute independence of the states of Central America and their complete sovereignty within the limits of their own territory, as well against Great Britain as against the United States. That object was supposed to have been accomplished by the convention of April 19, 1850 (the Clayton-Bulwer treaty), which would never have been signed or ratified on the part of the United States but for the conviction that, in virtue of its provisions, neither Great Britain nor the United States was thereafter to exercise any territorial sovereignty, in fact or in name, in any part of Central America, however or whensoever acquired, either before or afterwards. The essential object of the convention—the neutralization of the isthmus—would, of course, become a nullity if either Great Britain or the United States were to continue to hold exclusively islands or mainland of the isthmus, and more especially if, under any claim of protectorship of Indians, either government were to remain forever sovereign in fact of the Atlantic shores of the three states of Costa Rica, Nicaragua, and Honduras.

But in August, 1851, more than a year after the Clayton-Bulwer treaty had been perfected, a British vessel-of-war appeared in the fine and commanding harbor of Ruatan, an island belonging to the republic of Honduras. The captain of this vessel, an officer named Jolley, then proceeded to organize the island as a dependency of Belize (sometimes called British Honduras); and in July, 1852, a proclamation was made from Belize as follows:

OFFICE OF THE COLONIAL SECRETARY,

BELIZE, JULY 17, 1852.

This is to give notice that Her most Gracious Majesty our Queen has been pleased to constitute and make the islands of Ruatan, Bonacca, Utila, Barbarat, Helene, and Morat, to be a colony, to be known and designated as "The Colony of the Bay Islands."

By command of Her Majesty's Superintendent,

AUGUSTUS FRED. GORE, *Colonial Secretary*.

God save the Queen!

The British continued to hold possession of the Ruatan Islands up to 1856, and by the occasional presence of an English man-of-war at Greytown, continued their old pretensions to the Mosquito Coast. The threatened abrogation of the Clayton-Bulwer treaty restored matters to their old footing, except that the course of manifest destiny, during the intervening five years of drivelling diplomacy, ordained the occupation of the country by another race, in whom Great Britain found more energetic sticklers for the rights of their adopted soil than the dreamy and enfeebled creatures who for the preceding three centuries had claimed it as a home.

In March, 1852, Greytown was constituted a "free city," subject to the paramount authority of any power which might be decided to hold the government of the country to which Greytown belonged. All of its municipal regulations, port charges, and customs duties were determined by a mayor and council, who were, however, mere creatures of the British consul, the latter being virtually a dictator. The authorities of Greytown were formally acknowledged by the government of Great Britain, and Vice Admiral Sir George Seymour withdrew his ships from that station, as being no longer needed, thereby virtually confirming in the hands of, and acknowledging the ability of, the new government to maintain its laws. The people of Greytown looked with confidence for a similar recognition on the part of the United States.

At the time of which we are speaking, citizens of the United States had already established in the territory of Nicaragua a regular interoceanic transit route (the Accessory Transit Company), second in utility and value only to the one previously established in the territory of New Granada. By the year 1853, the Nicaragua route was doing a good business between New York and San Francisco. The trip between the two places was sometimes made in 19 days, which was shorter than by way of Panama. The steamer from New York went to Greytown, and there the passengers were put on board light-draft stern-wheel steamboats, which went up the San Juan River to Lake Nicaragua. There, at a village called Fort San Carlos, the passengers were transferred to commodious side-wheel steamboats, in which they crossed the lake to Virgin Bay, and from Virgin Bay they crossed in a conveyance of some kind to San Juan del Sur, a

distance of 10 miles, and then went on board the ocean steamer for San Francisco.

The condition of Nicaragua would doubtless have been much more prosperous at this time, but for the occupation of Greytown by Great Britain and the disturbing authority set up and sustained by that power in the Mosquito Coast, by means of which the domestic sovereignty of Nicaragua became impaired, its public lands withheld from settlement, and itself deprived of all the maritime revenue which it would otherwise have collected on important merchandise at Greytown. The United States Government had never recognized the sovereignty of a King of Mosquito, or the protectorate of Great Britain over Greytown. Daniel Webster, as Secretary of State, had, however, declared, in a letter to Commodore Foxhall A. Parker, dated March 13, 1852, that "a temporary recognition of the existing authority of the place (San Juan de Nicaragua, or Greytown), sufficient to countenance any well-intended endeavors on its part to preserve the public peace and punish wrong-doers, would not be inconsistent with the policy and honor of the United States"; and he accordingly directed the commodore, in the name of the President of the United States, "to repair to Greytown, and, in conjunction with Her Britannic Majesty's admiral on the West India Station, to see that all reasonable municipal and other regulations in force there were respected by the vessels and citizens of the United States resorting thither." Webster, also, learning that in an assemblage of persons styling themselves citizens of Greytown, held there on the 28th of February, 1852, resolutions had been passed to send a deputation to the capital of the republic of Nicaragua for the purpose of soliciting a charter for their city, requested, on the 18th of March following, Secretary of the Navy Graham to give to the American citizens, believed to have formed a majority of said assemblage, timely warning "that they would not be countenanced by his government in any attempt, forcibly or otherwise, to subvert the acting authorities." Subsequently, after the election of new municipal authorities at Greytown, in conformity with the constitution of March 29, 1852, and after the conclusion of the new treaty between the United States and Great Britain signed on the 30th of April of the same year, Lord Clarendon stated, in a despatch to the British minister at Washington, dated July 22, 1853, that both the British and American governments

had ordered their naval commanders to support the government *de facto* of Greytown; and Secretary of State Marcy, in a despatch to Mr. Ingersoll, the American minister at London, dated June 9, 1853, referring to said joint order, says that its purpose was to preserve the public peace at Greytown, and to punish wrongdoers.

The harbor of Greytown was formed by an island at the mouth of the San Juan River, and lying opposite to the town. On this island (called Punta Arenas) the Transit Company had its storehouses, and as long as the California passengers were detained occasionally and sent ashore to the town to pass a night or two, everything went smoothly. Finally, however, the company decided to build a hotel on the island, to keep the passengers on its side of the river during the transit, and to prevent their landing at Greytown at all—in short, to do all the “skinning” itself. This was more than the Greytowners could stand, and they accordingly declared war to the knife.¹

On February 3, 1853, the “council” of Greytown passed a resolution ordering the Accessory Transit Company to remove within five days the buildings which it had just completed on Punta Arenas, and also to vacate the entire tract within 30 days. The company naturally ignored the demand; and the agent of the company, agreeable to instructions received from his principals in New York, proceeded to call on the British warship *Geyser* for protection. Captain Wilson, of the *Geyser*, however, informed the agent that he could render him no assistance. Getting wind of this state of affairs, the American sloop-of-war *Cyane*, Commander George N. Hollins, repaired to Greytown in order to keep the peace. The *Cyane* arrived on the 10th of February, and the agent of the company at once appealed to Commander Hollins for protection.

A portion of the property had already been destroyed, and the authorities of Greytown were proceeding to destroy the rest, when Hollins decided to dispatch his first lieutenant, Theodore P. Green, to the mayor of Greytown, with orders to state that information had been lodged with the American commander that on the succeeding day (February 11) a writ of ejectment would be served by the Greytown authorities upon the Transit Company, and in

¹ Parker, “Recollections of a Naval Officer,” 165.

case of the company's refusal to remove the property, force would be used to compel them. Lieutenant Green found the council assembled, the mayor presiding, made the statement, and requested their answer. He was told to inform Commander Hollins that the process was a legal one, and that they would carry it into effect on the succeeding day, at 11 o'clock in the morning, unless prevented by a stronger force.

On the morning of the 11th, at 9 o'clock, Hollins went ashore to pay his respects to the mayor, and was received in the council chamber, the council being assembled. Hollins again informed them that in obedience to his orders he was compelled to put a stop to any depredations upon the property of the Transit Company. The mayor replied that "no depredations would be committed, they only intended to pull the building down." The mayor then requested a statement in writing of Hollins' intentions to prevent the execution of the process, which Hollins acceded to, and then withdrew to the ship.

Purser Charles C. Upham and Acting Lieutenant William H. Parker, of the *Cyane*, shortly afterwards returned from a visit to the town, bringing information that the troops were under arms and preparations making to proceed against Punta Arenas and its occupants, and that threats were being made to destroy the property by fire. Orders were accordingly given to land a marine guard on the Point, under the command of Lieutenant William Decatur Hurst, with instructions to inform the marshal that the property could not be molested, to warn off all suspected persons, and to prevent the execution of the threats. The marshal, upon being asked his business by Lieutenant Hurst, replied, "to tear down the buildings." Lieutenant Hurst then informed the marshal of his orders to protect the property of the company, and that he intended to obey and carry them out, whereupon the marshal immediately mustered his "posse of carpenters" and returned to Greytown.

From the many threats and the manifest excitement among the inhabitants of Greytown, Hollins deemed it necessary to continue the guard on Punta Arenas, about the property of the Transit Company, particularly at night. He also thought it proper to warn the citizens of Greytown of his intentions as to the persons and property of citizens of the United States who might be molested. One such instance had indeed already occurred. An American physician, named H. W. Wagner, was assaulted, on

March 14, in the most gross and indecent manner by three persons belonging to the militia of the town, who alleged, as an excuse, that Wagner had made false statements about the authorities having destroyed property belonging to another American citizen. Accordingly Hollins issued the following notice:

Inasmuch as no competent authority is in existence in the town of San Juan de Nicaragua to protect the property or persons of American or other citizens, and information having been lodged with me that an assault was committed upon the person of an American citizen by some person or persons in said town, I hereby warn all persons in said town that in case of any further molestation of any citizen or property, I shall take such steps as to bring the offender to punishment.

And further, that all boats to and from Point Arenas and San Juan de Nicaragua will pass within hail of the ship under my command.²

Hollins was soundly abused by the Greytowners for this, but he bore it philosophically, especially as the proclamation was heeded.³

Shortly afterwards, the *Geyser* again arrived off Greytown, under orders from Commodore McQuhae, who, it seems, had received a dispatch from the mayor of Greytown, informing him that Hollins had landed the marines of the *Cyane*, hauled down the Mosquito flag, taken charge of the town, and blockaded the harbor. Under this false impression the commodore had sent the commander of the *Geyser* to inquire into the facts of the case. It was plain that Commodore McQuhae had assumed to himself the right to district the limits of the city of Greytown. He included Punta Arenas within the jurisdiction of the city of Greytown, thus giving that city the right to execute any decree of their court, no matter how unjust to either persons or property. Hollins was fully convinced, from all that he saw and heard, that the whole cause of the hostility of Greytown towards the Transit Company proceeded from the company's refusing to move their depot and steamers to the city of Greytown, which would have been detrimental to their best interests.

In his official report to the Navy Department, Hollins justified his actions in the following terms:

On my arrival here, not having any authority by which I could be guided, I obeyed strictly the orders from the Navy Department to protect the property of the Accessory Transit Company, and also took for my guide the instructions of the late honorable Daniel Webster, which prescribes no

² Senate Exec. Doc. No. 8, 33d Cong., 1st Sess.

³ Parker, "Recollections of a Naval Officer," 165.

special limits to this town, nor recognizes any jurisdiction of its court other than for its own police purposes, but at the same time gives to commanders of both American and English vessels of war full power to correct abuses and settle all difficulties.⁴

The Navy Department approved the prompt and prudent action of Hollins, and under date of April 4, 1853, instructed him to remain in the vicinity of Greytown as long as his presence might be deemed necessary to protect the property and persons of American citizens. The Secretary of the Navy added:

It is, of course, very important, in order to avoid collision, that your course should be marked with caution; but, at the same time, the impression should be distinctly made that the United States are both able and determined to protect the property and rights of American citizens. Of course, you will confine yourself to that one duty, carefully avoiding any act committing your government in any of the contested questions of jurisdiction at present disturbing that country.⁵

In giving its approval to Hollins' conduct, the Secretary of the Navy deemed it proper, also, to state to him the real grounds on which that approval was based.

Your conduct in affording protection, and saving from destruction the property of that company, is commended not because of any supposed stipulation for that purpose by convention between Great Britain and the United States, but because American citizens are largely and chiefly interested in said company, the charter of which was granted and guaranteed by the State of Nicaragua, within the limits of which state the town of San Juan is situated, and which charter was granted even long before any attempt was made to convert Greytown into what is now alleged to be an independent city. The authorities of Greytown have no right to interfere with rights and privileges thus granted by the State of Nicaragua. When they therefore attempted to destroy the property of the company, your interference is justified and approved solely because it is regarded as an unauthorized attempt to disturb the rights of American citizens, and the United States desire that the American citizen "shall realize that, upon every sea and on every soil where our enterprise may rightfully seek the protection of our flag, American citizenship is an inviolable panoply for the security of American rights."⁶

Meanwhile, however, on February 13, 1853, Commander Hollins received a visit from the British vice consul, Henry Grant Foot, who had just returned from Bluefields. He brought with him dispatches from Vice Admiral Seymour and Commodore McQuhae, of Her Britannic Majesty's naval forces in the West Indies, directed to Commodore Parker, with directions to place

⁴ *Ibid.*

⁵ *Ibid.*

⁶ *Ibid.*

them in the hands of the senior American officer in command, in case Commodore Parker should be absent. These dispatches had reference to the concerting and concluding of such arrangements between Commodore Parker and Commodore McQuhae as should appear to both, conjointly, best suited to carry out the views of the British and American governments for the recognition of the *de facto* governing authorities of the port of Greytown, until some permanent arrangement should be concluded for the general and final settlement of the Mosquito and Central American question then pending between Great Britain, the United States, and certain of the Central American States.⁷

By the 16th of April, all was quiet again around Greytown. Hollins, however, soon heard rumors that the authorities of Greytown threatened the destruction of the Transit Company's property as soon as ever he left the harbor. Under these circumstances he did not deem it advisable to leave the place before being relieved, or before some positive arrangements could be made with the authorities, by which the property of the company would be respected. The English commanders in that region also received orders from their minister at Washington not to permit the property of the company to be molested, but at the same time their orders from the commodore of the station were for them not to remain in port over 48 hours, on account of preserving the health of their crews. The *Cyane* remained at Greytown for 70 days, "The dreariest time," as one of her officers subsequently wrote, "I ever passed in any foreign port, and that is saying a great deal. Our only excitement was caused by the arrival of the steamers from New York and New Orleans, which made fortnightly trips and brought us our mails, and the arrival of the steamers from Lake Nicaragua with the San Francisco passengers."⁸

On May 30, 1853, the sloop-of-war *Albany*, Commander James T. Gerry, arrived at Greytown. The authorities of the place, as well as the agents of the Transit Company, immediately called on Commander Gerry, who soon perceived from their accounts that a mediator was required to bring the two parties to a mutual

⁷ *Ibid.*

⁸ Parker, "Recollections of a Naval Officer," 165. The documents bearing upon these transactions between Hollins and the authorities of Greytown were called for by the Senate on the 6th of April, 1853, and printed as Senate Executive Document No. 8, of the 33d Congress, 1st Session.

friendly intercourse and a better understanding of each other's rights and views of subjects in dispute. Commander Gerry expressed his readiness to intercede and bring about a better feeling, provided each party should state to him all its grievances, and provided they consented to be influenced by his advice and opinion. The sequel showed that both parties had acted under strongly excited feelings, and that the one was quite as much at fault as the other. But in Commander Gerry's opinion, the inhabitants of Greytown were certainly entitled to more consideration than the Transit Company had extended to them, inasmuch as many of them had, at the company's invitation and through inducements held out to them, made large investments for accommodating the passengers of the company when the latter was unable to do so and depended solely upon the conveniences to be found in Greytown. The results of Gerry's investigations were attended with the most favorable consequences. On the 5th of June, he sailed from Greytown, leaving all parties apparently friends and determined to settle every point of controversy between them in future by arbitration, and not by violence.

Shortly after the arrival of Gerry at Greytown, also, the mayor informed him that if he wanted a marine who had deserted from the *Cyane* to be apprehended, he (the mayor) would order him in custody of an officer on board the *Albany* the following morning, which was promptly complied with as set forth.⁹

About a year later, events again occurred by reason of which the government of the United States considered itself justified in treating Greytown as a hostile city. In March, 1854, new differences arose between the people of Greytown and the Transit Company over the question of jurisdiction in Punta Arenas. Mr. Joseph L. White, agent of the company, left the place on the 17th of March, without having effected any settlement of the difficulties. Before leaving, he gave instructions to the captains and pursers of the steamships to pay no more port charges at Greytown, and to take no letters or other packages or freight for, and have no communication of any nature whatever with, the people of the town. This proceeding on the part of the company greatly exasperated the townspeople. Also, during the month of May, certain effects belonging to the company were feloniously taken

⁹ House Exec. Doc. No. 86, 33d Cong., 1st Sess., p. 230.

away by a servant of the company and conveyed to Greytown, where they were withheld from the company by the corporate authorities. And at the same time, and in connection with this occurrence, two of the employees of the company were arrested on warrants emanating from the town authorities, charged with having resisted a legal process and committing an assault, and were placed under bonds to keep the peace towards the authorities and citizens of Greytown.

Moreover, about the middle of May, the United States minister to Central America, Mr. Solon Borland, was about to leave Nicaragua, and took passage on board the *Routh*, one of the San Juan River steamers. Nothing particular occurred during the passage down the river, until the steamer was within a few miles of Greytown. There Captain T. T. Smith, who was in command of the *Routh*, in turning a bend of the river, ran against a bungo freighted with merchandise which was lying near the shore, and damaged her by the collision. The master of the bungo began to abuse Captain Smith in Spanish, to which the latter retorted fully in English. While the steamer was being extricated from the brushwood, Captain Smith went and got his rifle from the cabin, vociferating repeatedly, "I must shoot the fellow; he has used threatening language that shall cost him his life." Shortly afterwards the master of the bungo was shot down by Captain Smith from the upper deck of the steamer, and the latter then proceeded on her way down the river.

Mr. Borland had witnessed, if not the beginning, at least the greater part of this shooting, from the upper deck, but apparently made no interference. Another passenger, however, a Mr. H. Wiedemann, tried to persuade Captain Smith not to carry out his design. Wiedemann even went so far as twice to prevent Smith from firing. The third time, Smith exclaimed, "I am captain of this boat, and I will not permit even my best friend to interfere." After having committed the deed, he made the following remark to Wiedemann: "I am sorry for this, but I could not help it."

On the evening of the 16th, the *Routh* arrived at Punta Arenas and went alongside the steamer *Northern Light* to disembark her passengers. About dusk, while the passengers were going from one steamer to the other, a bungo, having on board some 25 or 30 armed men, mostly Jamaica negroes, headed by a mulatto man calling himself the "marshal," came over from Greytown

and ranged up alongside the *Routh*. The so-called marshal, accompanied by several of his armed men, jumped on board the steamer, and announced his purpose of arresting Captain Smith, by virtue of a warrant from the mayor of Greytown, on the charge of murder. Captain Smith, however, refused to be arrested and armed himself for resistance.

At this stage of the proceedings, Minister Borland, who was at the time on board the *Northern Light*, was informed of what was going on. He immediately went on board the *Routh*, where he found a crowd of persons, among them a number of the armed men from the bungo, in a high state of excitement. The marshal, with his men, was attempting to arrest Captain Smith; and the latter, standing at the cabin door, was keeping them at bay. Mr. Borland at once interposed, telling the marshal that no authority recognized by the United States existed at Greytown to arrest or in any way to interfere with an American citizen, and ordered him to withdraw his men from the steamer and go away. The marshal proposed to exhibit the mayor's warrant under which he was acting, but this Mr. Borland declined to examine.

After some hesitation, the marshal announced his purpose of withdrawing, as advised by Mr. Borland. But while this was going on, and before the marshal and his men had left the steamer, much excitement was manifested among the men who had remained on board the bungo. Loud, threatening language was used by them, and, brandishing their weapons, several at once rushed on board the steamer. At this moment, Mr. Borland, taking a rifle from the hands of a bystander, stepped over the railing upon the guards, and warned the men in the bungo to keep off, and at their peril not to put a foot on the steamer. Upon this, the movement towards boarding the steamer ceased, and in a few minutes the marshal and his men returned to the bungo, and she returned to Greytown.

About dark, Mr. Borland, accompanied by Mr. Scott, a son of the agent of the Transit Company, boarded one of the boats of the *Northern Light* and went across the harbor to Greytown, in order to visit Mr. Fabens, our commercial agent. Soon after arriving there, Mr. Borland heard that at a meeting of the people of the town, held at the station-house, and presided over by the mayor, it had been proposed, and seemingly agreed to, that he (Mr. Borland) should be arrested. In a few minutes the execu-

tion of this act was attempted. A loud knocking was heard at the lower doors of Mr. Fabens' house, and upon his going to ascertain the cause, a body of men, armed with muskets, consisting in part of the regular police of the town, and headed by a Jamaica negro, inquired for Mr. Borland, and declared their purpose of arresting him.

Mr. Borland, hearing this, went down-stairs, and demanded their business with him. The leader informed him that they had come by order of the mayor to arrest him because he had prevented the arrest of Captain Smith. Mr. Borland then repeated to them what he had said to the marshal about their want of authority, and inquired of them if they were not aware of his exemption from arrest in his capacity of minister of the United States. To this they replied that they cared nothing for all that, but that they had come to arrest him, and meant to do it. He then warned them of the serious consequences to themselves and to all concerned with them, if they proceeded to the extremities they proposed. They replied that they knew the consequences and were prepared to meet them. Mr. Borland then declared that they must proceed at their peril, and called several gentlemen, who were in an upper room, to come down and be witness of the threatened assault upon him. Thereupon the leader of the armed force called a Mr. Martin, who was ex-mayor, as if for the purpose of consultation, and Martin not answering, they went off a little from the door, in the direction where, from their manner, they expected to find him.

About this time, Mr. Borland still standing at the door, the mayor (a Frenchman) came up and said that these proceedings had been without his order and authority. To his proposition whether the minister would be satisfied with an address signed by all the respectable inhabitants of the place, expressing their indignation at the insult, Mr. Borland replied: "It is not I who have been insulted, but the government of the United States in my person." This naturally cut off all further endeavors on the part of the inhabitants to redress the matter. While this conversation was going on, some one from the crowd threw a broken bottle which struck Mr. Borland and slightly wounded him in the face. The particular person who threw the missile was not recognized, as the night was dark and there was a crowd on the porch about the door. Soon after this, the crowd dispersed.

Mr. Fabens, the commercial agent, then procured a canoe and crossed the harbor to the *Northern Light*, to make known the state of affairs on the other side. A meeting was held, at which it was agreed to send a committee of three gentlemen to consult with Mr. Boland as to the best steps to be taken. These gentlemen, with Mr. Fabens, proceeded in one of the steamer's boats to the town; but upon approaching the shore, they were hailed by a number of armed men, who fired one gun over the boat, and threatened to fire into them if they attempted to land, and this although informed that Mr. Fabens was on board and desired to go to his consulate. Thus forcibly prevented from landing, the boat returned to the *Northern Light*. During the night, Greytown was occupied by armed men, whose sentinels were stationed between the American consulate (where Mr. Borland still was) and the harbor, challenging all who attempted to pass, preventing boats from landing or leaving, and thus keeping Mr. Borland a prisoner all night.

The next morning, Mr. Borland procured a boat and returned on board the *Northern Light*, where he was informed by Mr. Fabens of the violent and lawless disposition manifested by the people of Greytown. The persons and property of our citizens were not deemed safe from aggression, or from destruction, in the absence of force sufficient to protect them. A meeting of the passengers was accordingly held, at which Mr. Borland proposed to engage the services of 50 men to remain and afford the necessary protection, until our government, informed of the state of affairs, should send a proper force for the purpose. The requisite number of men volunteered, and were organized under the command of Crawford Fletcher. Mr. Fabens took up his abode under their protection, while Mr. Borland embarked in the *Northern Light* to proceed forthwith to Washington and lay the matter before the government.

The *Northern Light* sailed on the evening of the 17th. The next morning the British war-steamer *Argus* arrived. The people of Greytown at once applied to her commander for an order to disperse the force of Americans at Punta Arenas, which he declined giving. The *Argus* remained four days in port, and sailed for Port Royal, Jamaica. On the morning of the arrival of the *Argus*, all the authorities of Greytown resigned their offices. The station-house, with the arms and ammunition belonging to

the town, continued in the possession of the Jamaica negroes, the same who had committed the outrage related above.

With respect to the existing controversy between the authorities of Greytown and the Transit Company, it was alleged by the residents of Greytown that the agents of the company wished to overthrow the authorities for two reasons: first, to relieve the company from port charges; and, secondly, to secure to certain employees of the company possession and title to lands within the jurisdiction of Greytown, acquired under an imperfect title. In order to carry out their object, it was alleged that the President of the United States was informed that it was due to the protection of American property there located, and in transit across the territory occupied by them, that Greytown should be destroyed and the inhabitants thereof dispersed. Accordingly, the President sent the sloop-of-war *Cyane* to the harbor of Greytown, with instructions to demand that immediate indemnity in a large amount should be made to the Transit Company, with prompt apology for the insult offered the United States minister, and satisfactory assurance for the future good behavior of the community.¹⁰

On June 10, the *Cyane*, which was then in New York, was ordered to proceed to Greytown. The orders to Commander Hollins included the following admonition:

It is very desirable that these people should be taught that the United States will not tolerate these outrages, and that they have the power and the determination to check them. It is, however, very much to be hoped that you can effect the purposes of your visit without a resort to violence and destruction of property and loss of life. The presence of your vessel will, no doubt, work much good. The department reposes much in your prudence and good sense.

Meanwhile, on June 24, our consul, Mr. Fabens, notified the late "acting authorities and the people of the town" that the United States Government would require of them reparation for the wrongs they had committed against our citizens. He received no official reply, the town being, as has been said, without political organization. But the information which reached Fabens through private sources was to the effect that the people of the town were fully determined to make no pecuniary redress, either to the Transit Company or to the government of the United States, for

¹⁰ House Rept. No. 281, 36th Cong., 1st Sess.

any obnoxious acts they might have committed. In the matter of the personal assault upon Mr. Borland, they were especially insulting in their remarks, and regretted, to use their own language, that they had not kept him a prisoner at Greytown and made him answerable for the act alleged to have been committed by Captain Smith.

The *Cyane* arrived at Greytown on July 11. After conferring on the situation, it was decided by Mr. Fabens and Commander Hollins that it would be expedient to renew the demand already made for reparation, and in such a manner as to impress the people of the town with the idea that satisfaction for their past injuries and insults towards American citizens must and would be had. Thereupon Fabens proceeded at once to Punta Arenas, to agree with Mr. Scott, agent of the Transit Company, as to the sum of money proper to be demanded for the losses and damages suffered by the company. Mr. Scott placed the sum at six thousand dollars. This amount being fully approved by Commander Hollins, on the same evening the demand was made, as follows:

COMMERCIAL AGENCY, UNITED STATES OF AMERICA,

SAN JUAN DEL NORTE, NICARAGUA, July 11, 1854.

To those now or lately pretending to and exercising authority in, and to the people of, San Juan del Norte:

GENTLEMEN: On the 24th ultimo, in accordance with the instructions of the government of the United States of America, I notified you that the said government would require of you immediate reparation for the property belonging to the Accessory Transit Company, which was stolen from the said company and received by you, as specified in my letter of that date, as well as for all damages suffered by their agents and employes while endeavoring to repossess themselves of the same. I have now, acting in concert with Commander Hollins, of the United States ship *Cyane*, at present in this harbor, to demand of you immediate payment of the sum of sixteen thousand dollars, which has been adjudged to be the proper sum for you to pay for the said property and the gross outrages perpetrated by you upon the persons of American citizens, as set forth in protests of Mr. Scott of the 12th May last, copies of which have already been served upon you.

There is likewise a claim of the Accessory Transit Company versus the acting authorities of San Juan del Norte for the sum of eight thousand dollars, as specified in my letter to you of the 24th ultimo. This you will be likewise expected to pay forthwith.

For the indignity offered to the United States of America in the conduct of the authorities and people of this town towards their minister, Mr. Bor-

land, while recently in this place, nothing short of an apology, promptly made, and satisfactory assurances given to Commander Hollins of future good behavior on the part of said authorities and people towards the United States and her public functionaries, who may in future be here, will save the place from the infliction which its late acts justly merit.

Your obedient servant,

JOSEPH W. FABENS,

United States Commercial Agent.

To this demand, the same reply, substantially, was given as to the previous one, only it was couched in more insolent language. But the presence in the harbor, at the time, of the British war-schooner *Bermuda* may have had some influence on the conduct of the people of Greytown on this occasion.

On the 12th of July, Hollins decided to give the offenders 24 hours' further notice to render satisfaction, and if this was not offered at the expiration of that time, to bombard the town. He accordingly, on the morning of that day, issued the following proclamation:

PROCLAMATION

To all men to whom these presents shall come, or to whom they may concern, greeting:

Know ye, that whereas certain gross outrages have, at sundry times, been perpetrated by the "authorities" (so called) and people of San Juan del Norte upon the persons and property of American citizens at that place and vicinity, and whereas a serious insult and indignity has been offered to the United States in the conduct of the said authorities and people towards Mr. Borland, United States minister to Central America, for which outrage and insult no indemnity has been given, and no satisfactory reply returned to demands already made:

Now, therefore, I, George N. Hollins, commander of the United States ship of war *Cyane*, by virtue of my instructions from the United States Government at Washington, do hereby solemnly proclaim and declare, that if the demands for satisfaction in the matters above-named, specified in the letter of Mr. Fabens, United States commercial agent, dated 11th instant, are not forthwith complied with, I shall, at 9 o'clock a. m., of to-morrow, 13th instant, proceed to bombard the town of San Juan del Norte aforesaid, to the end that the rights of our country and citizens may be vindicated, and as a guarantee for future protection.

GEORGE N. HOLLINS, *Commander.*

U. S. SHIP "CYANE,"

HARBOR OF SAN JUAN DEL NORTE, NICARAGUA, 9 a. m., July 12, 1854.

Copies of this proclamation Fabens caused to be posted in the three most conspicuous parts of the town, where they were

universally read. The British man-of-war *Bermuda* was still lying in the harbor, right between the *Cyane* and the shore. The British captain, W. D. Jolley, refused to move out of range until the guns of the *Cyane* had been trained so as to rake his decks, when he reluctantly dropped astern. At the same time, he entered a protest against this course of conduct on the part of the American commander. He wrote to Hollins as follows:

The inhabitants of this city, as well as the houses and property, are entirely defenceless and quite at your mercy. I do therefore notify you that such an act will be without precedent among civilized nations; and I beg to call your attention to the fact that a large amount of property of British subjects, as well as others, which it is my duty to protect, will be destroyed; but the force under my command is so totally inadequate for this protection against the *Cyane*, I can only enter this my protest.

To which Commander Hollins at once replied:

The people of San Juan del Norte have seen fit to commit outrages upon the property and persons of citizens of the United States after a manner only to be regarded as piratical, and I am directed to enforce that reparation demanded by my government. Be assured I sympathize with yourself in the risk of English subjects and property under the circumstances, and regret exceedingly the force under your command is not doubly equal to that of the *Cyane*.¹¹

This disparity in force, as one chronicler has it, "is to be regretted, in view of the wearisome and vain diplomacy afterwards spent upon a question which force alone, or the show of it, could finally settle."¹²

On the morning of the 12th, as an earnest of his intentions as set forth in the proclamation, Commander Hollins dispatched a guard of marines and seamen, under the command of Lieutenants Pickering and Fauntleroy, to secure the arms and ammunition in the town, as an evident disposition was manifest among the people to make an improper use of them; and also to assist and protect Mr. Fabens and others in the removal of their property. This duty was quickly performed, and the arms and other things deposited on Punta Arenas, in charge of the agent of the Transit Company, to await further disposition. At the same time, foreigners generally, and those favorable to the United States, were notified that a steamer would be in readiness on the morning of

¹¹ Senate Exec. Doc. No. 85, and House Exec. Doc. No. 126, 33d Cong., 1st Sess.

¹² Roche, "Story of the Filibusters," 68.

the day of the bombardment, to convey such as were disposed to a place of safety.

Agreeable to promise, a steamer was sent to the town at daylight on the morning of the 13th. Only a few of the inhabitants accepted the proffered assistance, and were conveyed to Punta Arenas. The majority of the inhabitants either from fright or from a wish to set at defiance the threats made against the town, had left, or were willing to remain and risk the consequences. Hollins had hoped that the show of determination on the part of his ship would, at this stage of the proceedings, have brought about a satisfactory adjustment of the differences; but this total disregard for and contempt toward the government of the United States determined him to execute his threats to the letter.

At 9 o'clock, on the morning of the 13th of July, the *Cyane's* batteries were opened on the town with shot and shell for three-quarters of an hour, followed by an intermission of equal duration, after which the batteries were opened again for half an hour, followed by a second intermission of three hours. At the expiration of this time, the firing was recommenced and continued for 20 minutes, when the bombardment ceased. The object of these several intervals in the bombardment was, that an opportunity to treat and satisfactorily arrange matters might be furnished the inhabitants of the town. No advantage was taken of this consideration, and at 4 p. m., a command, under Lieutenants Pickering and Fauntleroy, was sent on shore with orders to complete the destruction of the town by fire. The property of Mr. De Barwell, a Frenchman, was directed to be exempted from destruction, if possible, as Hollins had learned that he had protested against, and had held himself aloof from, any co-operation with the townspeople or pretended authorities of Greytown. The town was thus destroyed, for the greater part, in the short space of two hours. No lives were lost, although an attack was made by an armed party on the command of Lieutenants Pickering and Fauntleroy; but on the volley being returned, the attacking party fled. The shots were returned more for the purpose of frightening than to destroy life, and had the desired effect.

The execution done by shot and shell amounted almost to the total destruction of the buildings. But it was thought best to make the punishment of such a character as to inculcate a lesson never to be forgotten by those who had for so long a time set

at defiance all warnings, as well as to satisfy the whole world that the United States had the power and determination to enforce that reparation and respect due them as a government, in whatever quarter the outrage might be committed. The property destroyed was valued by the inhabitants at \$1,200,000.¹³

The Royal Mail-Packet *Dee* arrived in the harbor during the conflagration, but left immediately, taking in tow the *Bermuda*, thus leaving the English subjects referred to in Lieutenant Jolley's communication without any assistance. No communication from Lieutenant Jolley was made with the *Cyane* prior to his departure. But Hollins learned that Jolley carried with him a number of the principal participators in the outrages that had been committed by the town of San Juan, and among them was the former mayor, Mr. Martin. On the 14th, Mr. Fabens and his effects were removed to the *Cyane* for safe-keeping, and shortly afterwards the vessel departed for Boston.¹⁴

At the time these events took place, Greytown numbered about 300 inhabitants, of all sorts, consisting of a few Englishmen, Frenchmen, Germans, and men from the United States, but mainly of negroes from Jamaica and some natives of the Mosquito Shore. There were also two or three natives from the interior of Nicaragua. The Jamaica negroes constituted the majority, and exercised the greatest influence. At the last election and corporate organization, no American (except one mulatto man from New Orleans) was included. Of these people, some 75 to 100 could be mustered for military service, and they had in their possession three brass cannons—one 18-pounder and two 12-pounders—and about 200 muskets. With the exception of a few persons, these people owned no property, and had no ostensible means of livelihood. In their anomalous condition, without a government which any civilized nation could recognize, and occupying, indeed, by usurpation, territory which our government recognized as belonging to Nicaragua, and being, moreover, persons almost without exception of notoriously bad character, some of them discharged penitentiary convicts and refugees from justice, habitually manifesting evil dispositions towards our citizens, and indulging those dispositions to the injury of persons and property whenever they

¹³ House Rept. No. 281, 36th Cong., 1st Sess.

¹⁴ Senate Exec. Doc. No. 85, and House Exec. Doc. No. 126, 33d Cong., 1st Sess.

were not restrained by force, they could hardly be regarded in any other light than as pirates and outlaws, upon whom punishment to the extent of extermination might rightfully be inflicted by any hand that had the power.¹⁵

In Mr. Borland's opinion, at least, the interests of good government and humanity imposed the duty on any offended party of inflicting such punishment in a manner at once summary and effective.¹⁶ "But it was a pitiable spectacle," says one historian, "to see a great republic wasting its powder on the miserable huts of these outlaws, while the real offenders against its dignity sat quietly by under the protecting folds of the Union Jack. The guns of the *Cyane* might with more justice have been turned upon the instigators of all the trouble."¹⁷

The foregoing is believed to be the only full and connected account of the bombardment and destruction of Greytown by the naval forces of the United States. Even Commander Parker, who served on board the *Cyane* at the time, and who published his "Recollections of a Naval Officer" in 1883, disposes of the episode in about four lines. He writes: "The *Cyane* returned to Greytown in 1854 and bombarded it. I have really forgotten on what grounds Captain Hollins did this; but it was a nest of pirates, and the pity is he did not destroy the inhabitants and spare the houses."¹⁸

¹⁵ W. H. Parker, who was an acting lieutenant on board the *Cyane*, says: "The town at the time of our visit in the spring of 1853 was inhabited by a lawless set of desperadoes, of all nations, who had organized some kind of a city government. The mayor was said to have been an escaped convict from Sing Sing, and I believe it was so, for the others were evidently tarred with the same brush. They resembled the old buccaneers in everything save courage. These people made a living by preying upon the passengers passing to and from California, of whom large numbers were detained at Greytown a day or two at a time on their passage—more by design than by accident. Nearly every house was a hotel."—Parker, "Recollections of a Naval Officer," 164-5.

¹⁶ Senate Exec. Doc. No. 85, and House Exec. Doc. No. 126, 33d Cong., 1st Sess.

¹⁷ Scroggs, "Filibusters and Financiers," 77-78.

¹⁸ Parker, "Recollections," 170. On July 31, 1854, in compliance with a joint resolution of both Houses of Congress, dated July 28, President Pierce transmitted the official documents in regard to the destruction of Greytown. These documents were printed as Senate Executive Document No. 85, and also as House Executive Document No. 126, of the 33d Congress, 1st Session.

Through the British, French, and German ministers at Washington, the citizens of Great Britain, France, and the Hanse Towns who sustained losses in the bombardment of Greytown tried to secure indemnity from the United States, but without success.¹⁹ It remained, however, for certain citizens of the United States, some years later (in 1860), to petition Congress successfully with regard to the injuries suffered by them through the bombardment. These memorialists alleged that the criminal charges made against the community of Greytown were untrue, and had been fabricated by its enemies for the purpose of deceiving and misleading the United States Government; and they charged that the entire course of the naval and civil representatives of the United States then at Greytown was irregular and unwarrantable, and that they were entitled to indemnity for the losses sustained in consequence of said destruction of their property. The House Committee on Foreign Affairs, regarding it as the duty of a powerful nation to do exact justice to a feeble and unprotected people complaining of injury at its hands, and especially to examine whether citizens of the United States had been injured by their own government acting upon false or insufficient information, recommended the adoption of resolutions for their relief.²⁰

¹⁹ See Senate Exec. Docs. Nos. 9 and 10, 35th Cong., 1st Sess.

²⁰ See House Rept. No. 281, 36th Cong., 1st Sess.

[TO BE CONTINUED]

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

LETTERS ON NAVAL STRATEGY

BASED ON THE NAVAL CAMPAIGN OF 1805

By LIEUTENANT HOLLOWAY H. FROST, U. S. Navy

FIRST LETTER

I. INTRODUCTION

The German military writer Prince Kraft zu Hohenlohe-Ingelfingen in his well-known work "Letters on Strategy" describes several military campaigns from the point of view of the commanding generals. By careful and impartial criticism he shows how leaders have in some cases correctly applied the principles upon which the art of strategy is based. In other cases, where leaders have failed to apply correctly these principles, he shows the causes which have been responsible for their failure. Prince Hohenlohe gives us in this way an excellent exposition of the principles of military strategy and the various ways in which they should be applied in land warfare. As yet no one has covered the field of naval strategy in this way. It will be my object to do this.

While there are a great number of campaigns on land which could be used to illustrate the art of military strategy, there have been comparatively few on the sea which can be used for a study of naval strategy.

You must admit that the greatest naval campaign in history from the strategical point of view was that of 1805 between Napoleon and England. This campaign had the whole Atlantic Ocean for its stage, and it might well have spread into the Indian Ocean too had Napoleon wished it. More great leaders played parts in this campaign than in any other on the sea: on the French side was the master, Napoleon; on the English side were Pitt, Barham and Nelson. In addition, and this is most important for our purpose, it has been more carefully studied than any other campaign, and in recent years not only the facts, but even the detailed plans of the opposing leaders have been set forth by careful historians.

Julian Corbett, the well-known English writer, describes the campaign from the English point of view in his detailed work "The Campaign of Trafalgar." We may presume that the facts concerning the English forces, as he gives them, are accurate. However, his hatred of Napoleon is so apparent that his opinions regarding the French forces must be carefully considered before they are accepted. Colonel Desbrière of the French Army in his work "*La Campagne Maritime de 1805*" covers the ground very thoroughly from the French point of view. Details may occasionally be supplied from Mahan, Jurien de la Gravière and James, while the Naval Chronicles give some valuable information as to the disposition of the English forces. The "Barham Papers" and "Blockade of Brest" give the English orders issued.

Having gained the facts from these authorities, I will proceed in my own way to deduce the conclusions from them. We will endeavor to see the various general principles of the art of naval strategy and the ways in which they were applied by the leaders in this campaign. In carrying out this program, it will not be my object to criticize the leaders for what might be considered mistakes. Such criticism is never profitable. In order to make a careful and impartial criticism, one must put himself in the place of the leader whose work he is examining, one must look at the situation from his point of view and with the information he had at the time. Also, one must take into consideration the fact that one can arrive at a correct decision more easily when he has no responsibility in the matter, than when the fate of a nation depends upon his actions. It is always easy for the looker-on at a game of chess or cards to see glaring mistakes on the part of the player. How much more so is this true of war, where the critic is out of danger and has no responsibility, while the admiral's decision may determine the course of the whole war! Napoleon once said that "people formed a very incorrect idea of the strength necessary to wage, with a full knowledge of its consequences, one of those great battles upon which depended the fate of an army and a country." If, therefore, we should see that such men as Napoleon, Barham and Nelson made what we, with our imperfect knowledge, might call mistakes, it should only prove to us how difficult it is to avoid them. If we expect to see a certain number of mistakes on the part of even these great leaders, we will be merely wasting time if we indulge in criticism of the

lesser leaders. I believe that none of you would wish to have me repeat the criticisms which have been leveled at the poor scapegoat Villeneuve for over a century, and the violent attacks which every English historian has made upon Napoleon's conduct in this campaign. Therefore, when it would appear that mistakes have been made, we will not criticize the leader who apparently made them, but will try to discover the causes for these mistakes, so that if any one of us is ever in a similar situation, he may have a hint as to how to avoid repeating them.

2. THE POLITICAL OBJECTS OF NAPOLEON AND ENGLAND

Strategy is so closely connected with policy, that we must begin our examination of the campaign with a rapid glance over the political situation. At the beginning of 1805, England was arrayed against a combination of France, Spain and Holland, at whose head was Napoleon. Naturally, the ultimate political object of each nation was the complete overthrow of the other. However, the attitude of the other European nations gave each an immediate object, as it might be called. The English saw that, although they might maintain a successful defence without the assistance of other nations, any real offensive against France was impossible without the assistance of continental nations. Therefore William Pitt, the very able Prime Minister, was trying to engineer a great coalition of continental nations against France. This great combination was to include Russia, Austria, Prussia, Sweden, Naples and Portugal. Pitt was assisted in his work by the alarm of these nations caused by Napoleon's aggressive policy, but was hindered by their fear of France and Napoleon. Each of the continental nations would have been glad to overthrow Napoleon, but as Napoleon was known to be treating with all of them, and offering them bribes for their services, each one distrusted the others and feared to take the initiative and declare openly against France, lest by the treachery or delay of the others, it would be left exposed singly to the might of France and the genius of Napoleon.

Thus England's great object was to organize this great coalition against Napoleon. Napoleon's object was naturally to strike down England before the continental nations could come to her assistance.

3. THE MILITARY MEANS OF GAINING THESE POLITICAL OBJECTS

You will say that it was naturally the task of policy and not that of strategy to organize the coalition. But you must admit that it was in this case too big a job for policy to handle. It would be rather a difficult job for the diplomat to induce any nation to declare against Napoleon at that time because, no matter what arrangements would be made with other nations to cooperate, this first nation was almost certain to have to stand alone against Napoleon on the land for some time, while the other nations looked on and saw the direction in which the events were marching before they lived up to their agreements. It is true that this first nation would have the assistance of England, but this, despite the great naval victories, had not thus far been of great advantage to the continental nations. These nations recognized the fact that England could, with her superior sea power, maintain a war for years without serious risk, but that they could not enter the war without running the risk of immediate and complete overthrow by the French Army. Therefore, to induce the continental nations to join the coalition it was necessary for England:

- 1st. To prove to the continental nations that she could assist them in the land warfare; and,

- 2d. To prove that she was confident as to the result of this land warfare, by taking such a position that she could not escape a great loss should this warfare result unfavorably.

The only way for England to do this was to send her entire army of regular troops to the continent. This would show that England could be of considerable actual assistance on the continent and would show that she was really in earnest. Thus the only effective military means by which England could gain her immediate political object was to cooperate on the continent with the armies of Austria, Russia and Prussia.

Napoleon had three military methods by which he might strike down England:

- 1st. An invasion in force of England.

- 2d. Operations against the English commerce.

- 3d. Operations against the English colonies.

Now we must see what forces Napoleon had available for the execution of these plans of operations. First let us examine the

strength of his naval forces, as these were naturally, from the character of the war, the most important. As the ships of the line composed the real battle force it is with them that we will be principally concerned. Ships of the line can be divided into three general classes:

- 1st. Three-deckers of from 120 to 98 guns.
- 2d. Two-deckers of from 80 to 64 guns.
- 3d. Fifty-gun ships.

If we take the two-decker as unity, we may count the three-decker as equal to two units. Corbett discusses this matter very fully and you may refer to him for the reasons which led him to this conclusion. While I believe the following proposal to be original, I think we might consider, without great inaccuracy, the 50-gun ship to be equivalent to one-half a unit. Thus in determining the strength of any squadron we will in our discussion consider:

- 1st. A three-decker as two units.
- 2d. A two-decker as one unit.
- 3d. A 50-gun ship as one-half a unit.

In addition to the ships of the line there were frigates, having from 44 to 32 guns, and corvettes, brigs, sloops and cutters. These classes of ships rarely took part in actions between ships of the line, and were used for scouting, carrying information, escorting convoys, and cruising singly to defend commerce and attack the enemy's commerce.

At the beginning of January Napoleon's forces were disposed as follows:

At the Texel, Holland: Six Dutch two-deckers.....	6 units.
At Brest, France: Three three-deckers, 18 two-deckers, all French..	24 units.
At Rochefort, France: One three-decker, four two-deckers, all French	6 units.
At Ferrol, Spain: Five French two-deckers.....	5 units.
At Cadiz, Spain: One French two-decker, <i>Aigle</i>	1 unit.
At Toulon, France: Eleven French two-deckers.....	11 units.

This makes a total ready for sea in home waters of.....53 units.

In addition, there were in the East Indies one French two-decker, *Marengo*, and four Dutch two-deckers, five units in all; but the Dutch ships were in very poor condition and it is doubtful whether they were fit for active service. The Spanish Government had promised that by the end of March there would be at least 30 Spanish units ready for sea and available for Napoleon's use.

The principal land forces available for use against England were disposed as follows:

At the Texel, 25,000 men with transports, under the command of Marshal Marmont.

Near Boulogne, over 90,000, with a flotilla of over 1500 boats capable of carrying them to England, under the personal command of the Emperor.

4. THE DISPOSITIONS OF THE ENGLISH NAVAL FORCES

As the English Army was not ready on the 1st of January and would require at least three or four months' preparation before it could attempt operations on the continent, the English were reduced for the present to the strategical defensive. As Napoleon had several lines of attack, the English Navy had to be so disposed as to:

- 1st. Guard England itself from invasion;
- 2d. Protect as many as possible of the colonies; and,
- 3d. Protect as much as possible the oversea commerce.

Of these threats the most important was that of the invasion of England, and before anything else could be done, it was evident that an effective defence against this attack must be provided. As a means of local defence, a line of six old ships of the line were moored permanently along the English coast in the area through which the French flotilla must pass. On these were based a large number of small craft, which were backed up by a number of frigates. This local defence made it necessary for Napoleon to mass in the Straits a force strong enough to break it down. This French force naturally could not force its way into the Channel and maintain its position there for several days unless it were in turn supported by a battle fleet strong enough to drive clear the British battle squadrons. Thus Napoleon, if he desired to carry out the invasion project, must mass in the Channel a battle fleet so strong as to be able to maintain the control of the Channel for a number of days. Therefore you will say that the simplest way for the English to parry this most important attack would be to mass all their forces in the Channel, just as an army in a land campaign masses all its forces at the most important point. But while this would undoubtedly frustrate the Emperor's plan of invasion, it would give him a free hand to attack the English

commerce and colonies. The first strategic decision for the British Admiralty to make was whether it had a naval force sufficient:

- 1st. Merely to protect England against invasion; or,
- 2d. To repel in addition all attacks against their colonies and commerce.

Although the English fleet had been greatly reduced before the outbreak of the war as a result of St. Vincent's controversy with the dockyard officials, and although the French had received the assistance of the Dutch and Spanish navies, so that the total opposing forces were nearly equal in numbers, the Admiralty's decision was that it had sufficient force to repel all forms of hostile attack.

The most satisfactory method of frustrating all forms of French attack was naturally to hold in port all Napoleon's sea forces. To accomplish this object an English squadron was placed off each port in which hostile forces were ready for sea. The English doctrine was to make the blockading force slightly superior in fighting power to the force in port.

The fighting power of a force depends upon its physical, intellectual and moral powers. In this case the physical power is measured by the number, size and condition of the ships. The intellectual and moral powers are measured by the intelligence and the resolution and spirit of the admirals, officers and crews. The condition of the English ships, excepting the Mediterranean squadron, was very much better than that of the French and Spanish ships. In intellectual and moral powers the English held a very great advantage over their opponents. The long periods at sea and the constant fighting for over 10 years had given them an excellent knowledge of seamanship, tactics and strategy, and their great naval tradition had instilled in them a wonderful fighting spirit and had given them a confidence in themselves, which gave them an almost incalculable advantage over their opponents. Their flag officers were without exception able and accomplished, and some were brilliant. The personal influence of Nelson alone has been estimated by Mahan to be equivalent to a reinforcement of three ships of the line.

On the other hand, the Spanish squadrons were just being organized and their ships being commissioned, while the French and Dutch ships had not been to sea for a long period. The excesses of the French Revolution had driven the best officers

from the service, and the discipline of the crews had never been completely restored after the mutinies in the first years of the



A=Approximate
□=English Units

C=Cruiser Squadron
Leeward Islands ■ I

■=French Units
Jamaica Station ■ I

■=Spanish Units
India ■ I ■ 9

republic. Consequently, although there were many good officers and brave men in the Allied navies, as is shown so well by their hard fighting at Trafalgar, they were, as a rule, decidedly inferior

in intellect and resolution to the English officers and crews. The flag officers, although accomplished and personally brave, did not have the proper fighting spirit, and the traditions of their service had taught them to avoid rather than to seek battle. Finally, a fleet composed of ships of several nationalities was sure to be weakened by the jealousies which were certain to arise under such conditions.

Thus the mere numbers and size of ships alone can give no idea of the real relative fighting strength, because the English, with a considerably smaller number of ships, could, by reason of the superior quality of their personnel, count upon having equal fighting strength. It is naturally difficult to decide upon the relative fighting efficiency of the opposing forces, but we will probably be somewhere near the truth if we say that, when the units of the two opposing squadrons were equal in number, the English were superior in actual fighting strength in the ratio of approximately 4 to 3. Thus when you see Cornwallis blockading Brest with 19 units, while the French had 24 in port, you may assume that he is slightly superior. But you will note that the Admiralty rarely allowed Cornwallis' force to get as low as this, because it was a special policy of the Admiralty to maintain a considerable superiority at this most important position, and therefore they assigned to this squadron a minimum strength of 18 of the line. If we say that of these eight were three-deckers, this would give 26 units, a number approximately equal to that of the French force in port. Thus the English calculated that when their numbers were equal with those of the enemy, they had a superiority so great that defeat was practically impossible.

In accordance with their plan of blockading in port Napoleon's squadrons with English squadrons reasonably superior in fighting strength, the British Admiralty on January 1, 1805, had disposed their forces in European waters approximately as follows:

In the North Sea: Lord Keith with six two-deckers and six 50-gun ships, watching the Dutch division in the Texel and the Boulogne flotilla	9 units.
In the Channel: Admiral Saumarez with a strong cruiser squadron	
Off Brest: Lord Cornwallis, watching 24 French units in port, with approximately	19 units.
Off Rochefort: Admiral Graves with one three-decker and four two-deckers, watching a similar force in port.....	6 units.

Off Ferrol: Admiral Cochrane with one three-decker and five two-deckers, watching five French units in port and Spanish ships preparing for sea	7 units.
Off Cadiz: Admiral Orde with one three-decker and four two-deckers, watching one French unit and Spanish ships fitting out	6 units.
Off Toulon: Admiral Nelson with two three-deckers and 11 two-deckers watching 11 French units in Toulon and Spanish ships fitting out in Carthagea.....	13 units.

This gave the English a total of ships actually on the blockade of60 units.

These forces, with the exception of the Brest squadron, were sufficiently strong for their purpose. In addition, there was on the Irish station a force of three two-deckers and a large number of cruisers.

You will probably say, from an examination of the positions of these numerous squadrons, that they were dangerously dispersed, that the English had violated the cardinal principle of concentration. We have all heard so much of "concentration," that the word has become a catchword, and every one who does not keep his entire force massed together in one body is accused of failing to "concentrate." We must always remember that the degree of concentration of a force is determined by the positions of the enemy as well as our own positions, and from an examination of the actual situation you will probably agree that the English were better concentrated than were the French. As long as the situation remained unchanged the English were sufficiently concentrated, because, except for their Brest squadron, which was, however, quickly brought up to strength, their blockading squadrons were always superior in fighting power to the hostile squadrons in port. This is emphatically proved by the fact that during the entire campaign not one of Napoleon's squadrons left its port with the intention of forcing battle upon the English squadron blockading that port, except in the one case of the battle of Trafalgar, in which case you must admit the English to have been decidedly superior. But now you may bring up the case in which a French squadron might leave port, avoiding the blockading force stationed off it, and fall upon an English squadron, very inferior to itself, engaged in the blockade of another port. It must be admitted that such a change in the strategic

situation was liable to occur at any time and that, if it should occur, it would place the weaker English squadrons in a position of grave danger. Of course, the apparent way to prevent such an occurrence was to maintain the very strictest blockade at the ports in which the strongest French squadrons were stationed. But assuming that the enemy were to escape without being brought to action, there were two ways in which the danger of being attacked by superior numbers could be met. First, each squadron, regardless of the exact position of its ships of the line, kept several cruisers off the port, so that the sailing of the hostile squadron could be quickly reported to the squadron commander, the commanders of the adjacent squadrons and to the Admiralty itself. Often, when two cruisers sighted the enemy coming out, one left immediately with this information, while the other tracked the enemy, so as to determine his destination. Second, each squadron disposed a number of cruisers in a wide area around it, so as to give timely warning of the approach of a hostile squadron. In case both these methods failed and a superior hostile squadron appeared without warning, the Admiralty relied on the skill of the English commander and his captains to withdraw from their less efficient opponents and to concentrate on adjacent English squadrons. As you will see in the course of the campaign, French squadrons often escaped and came upon very inferior English forces by surprise, but in no case were they able to come up with them so as to inflict serious damage.

When the Admiralty completed their organization of the blockading squadrons, as enumerated above, they still had a considerable reserve of ships, both in commission and under repair. Let us first consider the ships ready for sea in English ports. The Channel squadron, under the command of Lord Cornwallis, was composed of:

- 1st. The Brest blockading squadron, under his own command;

- 2d. The Rochefort blockading squadron, under Graves; and,

- 3d. A reserve in the Channel ports, taking on water and provisions and refitting, which relieved ships in the blockading squadrons when it was necessary for them to renew their supply of water and provisions.

It is very difficult to determine the number of ships in this reserve, as, of course, its composition was changing from day to day, and we can do no more than make a rough estimate of its strength at the beginning of January. We may arrive at this as follows:

For April 15, the Naval Chronicle gives the total strength of the Channel squadron as:

10 three-deckers.

14 two-deckers.

2 50-gun ships.

A total of 35 units.

We can assume with reason that this figure is fairly accurate for January 1. Thus if we subtract from it the 19 units of the Brest force and the six units of the Rochefort force, we have a remainder of 10 units, which we may assume to be the strength of the reserve. All ships of this force could leave port on 24 hours' notice.

In addition to this first reserve, as we will call it, there were, in what we will call second reserve, the following ships of the line:

Two ships under orders for the India station.

Four ships manned and ready to go into commission.

The *Hibernia*, 110, and the *Revenge*, 74, building and practically completed.

A total of nine units which could get to sea in from one to three weeks.

Finally there were 19 units in third reserve, a proportion of which could be placed in commission, depending upon the exertions of the English in making repairs and collecting crews.

We may now sum up the opposing forces in Europe as follows:

French and Allies:

Ready for sea.....53 units.

Fitting out30 units.

Total (approximately)83 units.

English:

Actually at sea.....63 units.

First reserve, ready in 24 hours.....10 units.

Second reserve, ready in three weeks..... 9 units.

Total (approximately)82 units.

In addition third reserve (approximately).....19 units.

On the foreign stations there were the following English ships of the line:

India Station (Admiral Rainier):

Five 74's	} 9 units.
Three 64's		
Two 50's		

West Indies Station:

i. Leeward Islands (Commodore Hood): Two 74's..	} 4 units.
2. Jamaica (Admiral Dacres): Two 74's.....		

Total in full commission on foreign station (nearly all very old ships, and probably in poor repair).....13 units.

It is very possible that you will criticize this disposition of 13 units at such great distances from the main battle squadrons. You may even quote Napoleon as saying: "When you have resolved to fight, collect all your forces. One battalion may decide the day." If I admit that this is a true principle, then you will claim that the English blockading squadrons were "resolved to fight" should the French attempt to escape, and you will say that every possible ship should be used to reinforce the blockading squadrons up to their greatest possible strength. But if you resolve to fight, the enemy will often, on the sea, resolve not to fight, and will do his best to evade you. The question we must decide is whether a fleet in port may run the blockade without having to fight the blockading fleet, which is resolved to fight. If it cannot escape without a fight, then all ships should be used in the blockading squadron. If it has good chances of escaping, then under certain conditions it may be advisable to use a number of the ships to form squadrons on foreign stations as a second line of defence. Under the conditions of naval warfare to-day, it will be very difficult for blockaded squadrons to escape without a battle, and thus all the ships will under normal conditions be used in the blockading squadron—the first line. Under the conditions of naval warfare in 1805, on the other hand, it was very easy for small squadrons to run the blockade, and thus the use of a small number of the poorest ships as a second line on the foreign stations might under some conditions be justified.

Let us see just what the conditions were, and the chances for the enemy to undertake successful expeditions against the English colonies and commerce. First, take the case of India. This most important colony was at a great distance from home. If a hostile squadron were to leave France for an expedition in Indian waters,

it would get a great start before the English could determine its destination. The most important points on the route, Cape of Good Hope and Mauritius, were in Napoleon's hands and this would greatly assist a French squadron headed toward India and retard an English squadron in pursuit. The hold of the English in India was far from secure, even though the wars against Tippoo Sahib had been brought to a successful conclusion; and a small French landing force with the assistance of the natives might accomplish great results, if the command of the sea could be retained. That Napoleon would send out such an expedition certainly seemed probable, as his Egyptian expedition had been an attempt to reach India, and even in 1805 there were rumors, based on sound facts, to the effect that he intended to send a strong squadron to Indian waters. Finally, the presence of the *Marengo* and four Dutch ships of the line, poorly conditioned it is true, in the East Indies called for an equal English force to hold them in play.

While all the English possessions in the West Indies were within a comparatively small area, the steady easterly trade winds in reality formed two distinct stations, Jamaica and the Leeward Islands, as it required at least a month to beat against the wind from the former station to the latter. This fact practically doubled the forces required for their defence. While the West Indies were much nearer home than India, still about a month and a half was required for ships of the line to make the trip, and at least a month for fast cruisers. Thus, if a French squadron were to break the blockade and, avoiding contact, make for the West Indies, it would take about one and a half months for it to reach its destination, and another month for the news of its arrival to reach England. It would have a free hand in the islands for about two and a half months, in which time it should be able to achieve considerable results.

We may sum up the reasons for using the 13 units in question either with the blockading fleets or on the foreign stations as follows:

1st. By using them with the blockading squadrons they would:

- (a) Assist in repelling the invasion of England; and,
- (b) Assist in repelling attacks against English commerce and colonies only if the attacking squadron could be intercepted when it left port.

2d. By using them on foreign stations they would:

(a) Not assist in repelling the invasion of England;
but

(b) Would assist in repelling attacks against English commerce and colonies, should the attacking force not be intercepted when it left port.

Thus the use of these ships as a second line of defence for the English commerce and colonies could be justified only if the English forces in European waters were sufficiently strong, and would be sufficiently strong in the future, to defeat in battle all French and Spanish squadrons which might put to sea, either to assist in the invasion of England or to operate against English commerce and colonies. Whether the English blockading squadrons were sufficiently strong for this purpose at all times during the campaign is a matter upon which I would hesitate to give my opinion. They were certainly strong enough in the first part of the campaign, and it must have been a great relief to the Admiralty, when they received the reports of the escapes of Missiessy, Villeneuve and Allemand, to know that they had squadrons of heavy ships in Indian and West Indian waters. At the great crisis of the campaign, when the combined fleet of 30 units was at Ferrol, Lord Barham very possibly did not consider his forces in European waters entirely sufficient, and without doubt he would have been glad to have had the Indian and West Indian squadrons in the Channel. However this may be, it is certain that the English showed great confidence in their navy in thus maintaining such a large force in foreign waters. And it is also certain that, as it actually worked out, the results vindicated this confidence, for England was everywhere victorious on the sea.

SECOND LETTER

I. NAPOLEON'S FIRST MOVE

The most satisfactory operation for Napoleon was naturally to strike directly at England, to concentrate a superior force in the Channel to cover the crossing of the flotilla and of Marmont's force to England. This operation was also thoroughly in accord with Napoleon's principles of waging war. To effect this naval concentration, Napoleon had in Europe a total of 53 units, all French except the six Dutch ships in the Texel. As the English had at the beginning of the campaign 63 units actually at sea

and 10 more in the Channel ports ready to sail in 24 hours, and as the English were, ship for ship, considerably superior in efficiency to his own forces, it was evident that there was at present little hope for the success of his ambitious project. But by the end of March the Spanish had promised to have 30 units ready for sea, and when these ships were ready there would be far better chances of success. Therefore, you must admit that it was entirely proper for Napoleon to delay his major project until the Spanish ships would be available. As the major operation, therefore, could not be commenced at present, Napoleon had the choice of keeping his ships idle in port or of using them in minor operations against the English commerce and colonies. These operations, if successful, would have a certain moral effect, would allow the French ships to be shaken down by long cruises at sea, would train the personnel, and might deceive the English as to his ultimate purpose and draw away English squadrons from the more important European stations at the time when the major operation would commence. Napoleon, therefore, rather than allow his ships to lie idle in port, decided to use several of the French squadrons in minor operations, which might rather be called "raids." The raids, however, were not to interfere with the major operation, the invasion of England; for Napoleon was very careful to provide that all ships used in the raids should be back in their home ports in time to take part in this operation.

Napoleon, therefore, issued orders for the Rochefort and Toulon squadrons to sail for the West Indies. In making a detailed statement of the various orders issued throughout the campaign, I will follow a regular form:

1st. The assumption made as to the probable intentions of the enemy.

2d. The general plan assigned to our own forces.

3d. The detailed instructions to each one of the subdivisions of our own forces.

In practically all cases, the assumption and the general plan were not embodied in the actual orders, only the instructions to the subdivisions being given.

Napoleon's order will therefore be put in the following form:

CAMPAIGN ORDER NO. 1. ABOUT JANUARY 5

1. Assumption as to enemy intentions—None.

2. General plan—To raid the English colonies in the West Indies, thus drawing English forces there from Europe.

3. (a) The Rochefort squadron, Rear Admiral Missiessy, to sail for the West Indies at a set date, avoiding the blockading squadron, and meet the Toulon squadron there.
- (b) The Toulon squadron, Vice Admiral Villeneuve, to sail at the same time, and pick up Missiessy in the West Indies.
- (c) The united force to operate against the English colonies and commerce in the West Indies until the early spring, when they should return to Ferrol, rally the 15 ships which would be there ready for sea by that time, and proceed to a French port.
- (d) If only Missiessy should reach the West Indies, he was to reinforce the French garrison at San Domingo with the troops he carried and then return home.

Thus this plan was designed not only as a blow at the English commerce and colonies in the West Indies, but also to form a concentration of about 35 units in a French port for the major operation itself. At the same time that the above order was sent out, Napoleon issued the following:

SPECIAL ORDER. ABOUT JANUARY 5

Admiral Ganteaume to leave Brest with his entire squadron, make a descent upon the Irish coast, sail around Scotland and join the Dutch squadron in the Texel.

While we have no proof, it appears very probable that this order was given out especially for the benefit of the English spies and that its execution was never intended.

In accordance with his orders Missiessy sailed from Rochefort on January 11. His squadron consisted of the following ships:

<i>Majestueux</i>	120 guns.
<i>Magnanime</i>	80 guns.
<i>Lion</i>	74 guns.
<i>Suffren</i>	74 guns.
<i>Jemappe</i>	74 guns.
A total of.....	6 units.
Five cruisers. On the ships were 3500 troops.	

When Missiessy left port, the English blockading force under Graves very fortunately happened to be at Quiberon Bay, about 130 miles northwest of Rochefort, taking on stores, only two cruisers remaining on watch off the port. The French squadron ran into a heavy storm and was very severely damaged, but Missiessy resolutely kept on his way. The English cruisers followed Missiessy through the first part of the storm, and seeing the great damage received by the French squadron, left to inform Graves.

The storm prevented the cruisers from reaching Graves until January 16, six days after Missiessy had left port. By this time the French squadron was so far on its way that there was no chance for Graves to intercept it.

Now suppose that you were in the place of the English Admiralty, what course of action would you take? First you would have to determine the destination of the French squadron. It is impossible for you to say that it must have one of a certain set number of destinations, but you might say that its actual destination would most probably be one of the following:

- 1st. A French port in the Bay of Biscay.
- 2d. The Mediterranean.
- 3d. The West Indies.
- 4th. India.

A return to a French port in the Bay of Biscay, caused by damage received in the storm, would renew the original situation. A move into the Mediterranean would very probably be intercepted by Orde with six units of the Cadiz blockading squadron, but if Orde could be evaded and the Mediterranean be reached, the French would have 17 units there as against 13 for Nelson, not counting the Spanish ships fitting out at Carthage. A move to the West Indies could not be intercepted by any English squadron, and would give the French six units as against the four old 74's the English had there. A move to India would give the French seven units there to the English nine, not counting the four Dutch ships which very probably were not ready for sea. Thus we see that the West Indies was the danger point for the English, as it was on that station that the French had the greatest chance of inflicting damage upon the English commerce and colonies. Now perhaps you will say that the Admiralty should have immediately sent a squadron to the West Indies on the assumption that Missiessy was headed in that direction. I cannot agree to this, as it would have been a blow in the dark based on a mere guess, and not sound strategy. On the other hand, I claim that the Admiralty now gave an excellent example of the manner which to methodically clear up an obscure strategic situation. They decided to clear up in turn each possible course of action of the French squadron. In deciding upon the course of action to clear up first they took the one which would lead to a destination nearest to England because:

1st. This course could be cleared up in the shortest time; and,

2d. It was highly desirable to retain the force, detached in pursuit of Missiessy, as near the Channel as possible, until all destinations in European waters had been covered and it was practically certain that Missiessy was bound for a foreign station. A false move to a distance, unless it was certain that Missiessy was being followed, might mean the loss of a number of units for several months, thus playing into Napoleon's hands, if he really intended to carry out operations in home waters.

In accordance with these sound principles the Admiralty decided:

1st. To cover the possibility of a return to a French port in the Gulf of Biscay.

2d. To cover the possibility of a move toward the Mediterranean.

3d. To cover the possibility of a move to the West Indies.

4th. To leave India out of consideration for the present.

In accordance with this plan orders were given to look into all French ports in the Gulf of Biscay to determine the presence of the Rochefort squadron. As Cornwallis had been driven off his station by the storm the following ports had to be examined:

Brest, Rochefort and L'Orient.

By reason of exceptionally poor weather conditions it was not until about February 7, nearly a month after Missiessy had sailed, that it was determined that he had not returned to any of these ports. Thus the first possibility had been cleared up, and a squadron, equal to Missiessy's, could be safely sent away from the Bay of Biscay in pursuit of it, first clearing up the possibility of a move toward the Mediterranean, and then that of one toward the West Indies. Accordingly, the Admiralty gave the following orders to Cornwallis, who had in the meantime called in Graves to the main body of the Channel squadron off Brest:

CAMPAIGN ORDER NO. I. FEBRUARY 7

1. Assumption—Missiessy en route toward the Mediterranean or the West Indies.
2. General plan—To follow Missiessy with a superior force.
3. (a) Cornwallis to send Rear Admiral Calder with six units to relieve Rear Admiral Cochrane off Ferrol.

- (b) Cochrane with his entire force of seven units to go to Lisbon for information and to speak to Orde off Cadiz. If he heard that Missiessy had entered the Mediterranean, Cochrane was to reinforce Nelson with his entire force.
- (c) If there were no news of Missiessy, Cochrane was to touch at Madeira and then at the Cape Verde Islands for news. If he received reliable information as to Missiessy's destination, he was to follow him. If he received no news, he was to assume that he had gone to the West Indies, and sail for Barbadoes.
- (d) There were other instructions regarding his actions after he arrived in the West Indies which we will consider later.

In accordance with these orders Calder relieved Cochrane in the last week of February, and the latter sailed for Lisbon. His squadron consisted of the following ships of the line:

<i>St. George</i>	98 guns.
<i>Northumberland</i>	74 guns.
<i>Eagle</i>	74 guns.
<i>Atlas</i>	74 guns.
<i>Spartiate</i>	74 guns.
<i>Veteran</i>	74 guns.
A total of.....	7 units.

Cochrane touched in turn at all the points ordered, and, receiving no information of Missiessy, sailed for Barbadoes, where he arrived April 5. Missiessy had arrived at Martinique on February 20, just a month and a half before. Thus the Admiralty, by using sound and methodical strategy had lost a month and a half before the move of the enemy could be countered. Thus we see that the side which holds the initiative is always ahead of the enemy in the matter of time, because the latter has always to discover the move of the former and then make arrangements to counter it. If the side on the defensive does not wish to lose time, then he must make a stab in the dark, based upon a mere guess of his opponent's intentions. Thus the side having the initiative has always a great advantage, and this advantage is especially great in naval warfare, where it is so difficult to determine the intentions of the enemy. In land warfare one side may act on the offensive, take the initiative and retain it throughout the campaign. In war on the sea there is a peculiar condition which makes this impossible. The stronger side may act on the offensive and retain the initiative as long as the opposing forces keep the sea, but when they retire into securely fortified ports, then the stronger side must change from the attack to the defence, and the initiative

passes over to the enemy. Thus the stronger side, while it may gain the temporary command of the sea, can never gain a definite decision over the enemy naval force, unless the enemy gives him the opportunity, and not only is he prevented from gaining a definite decision, but he must pass over to the defensive and give the advantage of the initiative over to the enemy, who may select the time and the place for further operations.

Let us now see how events were marching in the Mediterranean. On January 17, six days after Missiessy's escape, Villeneuve sailed from Toulon for the West Indies in accordance with the Emperor's orders. His squadron was composed of the following ships of the line:

<i>Bucentaure</i>	80 guns.
<i>Neptune</i>	80 guns.
<i>Formidable</i>	80 guns.
<i>Indomptable</i>	80 guns.
<i>Pluton</i>	74 guns.
<i>Mont-Blanc</i>	74 guns.
<i>Berwick</i>	74 guns.
<i>Atlas</i>	74 guns.
<i>Swiftsure</i>	74 guns.
<i>Scipion</i>	74 guns.
<i>Intrepide</i>	74 guns.
A total of.....	11 units.

In addition he had nine cruisers, and he had embarked on his ships a large number of troops.

At the time of Villeneuve's sailing Nelson was at Maddalena Islands at the northern point of Sardinia with all his ships of the line, 13 units in all. Two of his frigates were watching Toulon in his absence. Villeneuve, upon leaving port, steered for the southern point of Sardinia. He ran into a very severe storm which caused great damage. The two English frigates followed him through the storm until the early morning of the 19th, when the French squadron was in the latitude of Ajaccio, Corsica, steering SSW. At this point they left for Nelson, whom they reached after dark that same day. As one French ship was forced to put into Ajaccio dismasted, and as three other ships were disabled, and all the other ships in very bad condition, Villeneuve decided the same day to return to port. He reached Toulon on the 21st without further loss. All his ships, including the one dismasted, were able to get back safely.

Now place yourself in Nelson's position and estimate the situation on the night of the 19th, when he received the reports of his frigates. The first plan which would occur to you, and one which Nelson surely must have considered, would be to head directly for the French fleet and force battle upon it. This would solve all his problems, if the French squadron could be found. But how was it to be found? No English ship was still with it to give him further information of its movements. If he were to guess at the probable course and speed of Villeneuve and set a course to intercept him, it would be a mere blow in the dark, with the chances in favor of Villeneuve's escaping without detection. If Nelson were to miss the enemy by such a move, so much precious time would be wasted that Villeneuve would have a long start on his way to the place selected for attack. Thus Nelson had a problem very similar to that which the Admiralty had been required to solve after Missiessy's escape. His solution was exactly similar to that made by the Admiralty. He recognized three general courses of action open to Villeneuve:

- 1st. An attack upon English possessions in the Mediterranean.

- 2d. A return to port, due to damage received in the storm.

- 3d. A move out into the Atlantic.

In case the French returned to port, then they would be so damaged that they would not be able to undertake any operations for some time, so no immediate danger would result from this course of action. In case they had left the Mediterranean, they would fall upon Orde and Cochrane and would be in a position to do the English great injury, but as Nelson was responsible for the Mediterranean station it would certainly not be proper for him to leave it until he was certain that the French had left it, especially as Villeneuve's course so far to the eastward would seem to indicate that he was about to attack English possessions in the Mediterranean, and as Napoleon, that master of deception, had been moving troops into Italy, as if to embark them for an oversea expedition. Thus if Nelson were to clear up the situation logically and methodically it would be proper for him to:

- 1st. Take a position with his ships of the line to cover the English possessions in the Mediterranean.

- 2d. To reconnoiter Toulon with cruisers, with a view to determining the presence of the French squadron.

3d. After it was proved that the French squadron had left the Mediterranean, to leave a few cruisers on the station and follow it with the remaining force.

This was exactly Nelson's decision.

The English possessions, or rather those belonging to allies and thus under English protection, can be divided into two groups:

1st. The center Mediterranean group: Sardinia, Sicily, Naples and Malta.

2d. The eastern Mediterranean group: Greece, Corfu, Turkey and Egypt.

The most natural and the easiest way for Nelson to protect all these widely scattered territories was for him to hold the line: Corsica-Sardinia-Tunis. If he observed this line with his frigates, and took up a position with his squadron at the southern end of Sardinia, he could probably intercept Villeneuve and force battle upon him. This then was Nelson's plan. Sending out his frigates to observe the line, he got under way immediately and stood down the eastern coast of Sardinia. On the 22d he had reached a point 50 miles east of Cagliari, a city at the southern end of Sardinia, when one of his frigates reported that a French frigate had been sighted standing into that port. Nelson naturally believed that this ship was accompanying the main French force and at once headed toward it. But here a strong westerly gale sprang up and prevented him from reaching Cagliari until the 26th. Here he discovered that no French ship had been in port. On the next day word was received that a French ship of the line had put into Ajaccio. Neglecting the possibility of a move into the Atlantic it was now practically certain that Villeneuve had either put back into port or passed between Sardinia and Tunis, which part of the line the storm had prevented the frigates from covering. Nelson personally believed that Villeneuve had gone back to Toulon, but if this was so all was well no matter what he did. Therefore he assumed that Villeneuve had passed south of Sardinia. If Villeneuve had taken this course, he had two possible moves:

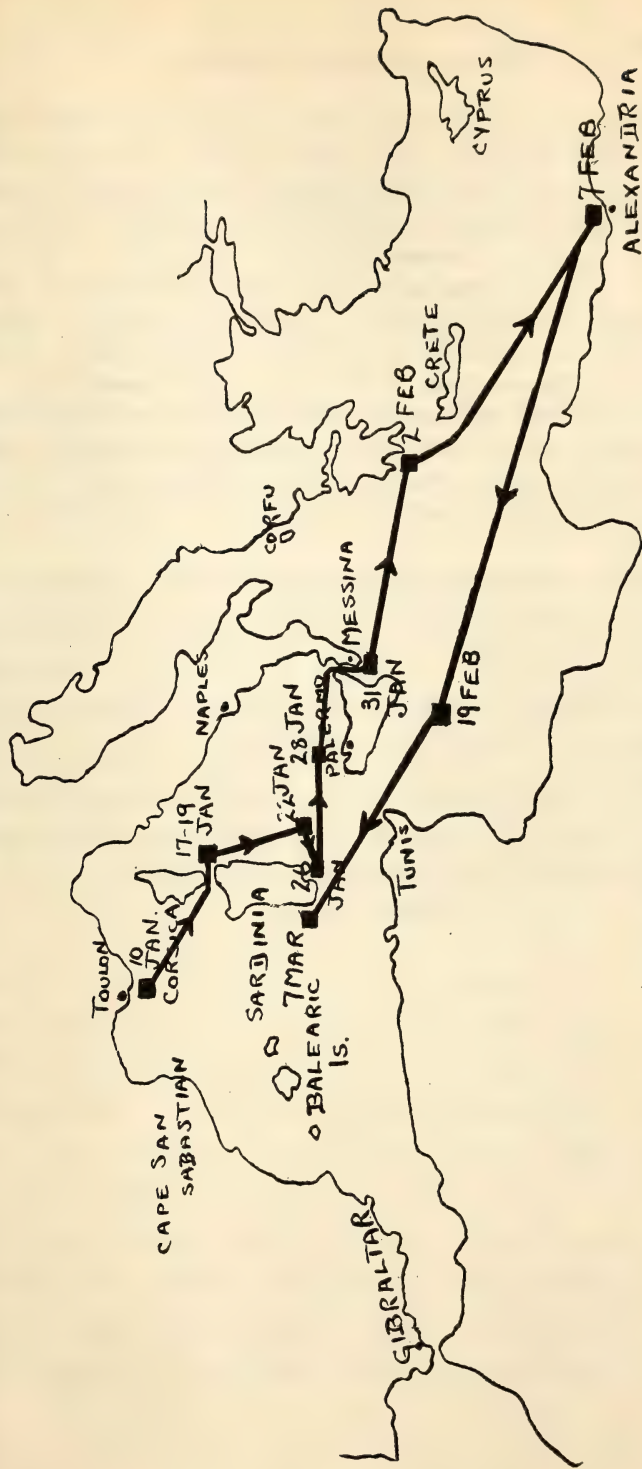
1st. A course to the northward of Sicily for an attack against Sicily or Naples.

2d. A course to the southward of Sicily for an expedition into the eastern Mediterranean.

Nelson naturally determined to clear up the first course, as this could be done quicker. He therefore went to Palermo, arriving there on the 28th. By this time it was practically certain that the middle Mediterranean was secure. The next course of the enemy to cover was that to the southward of Sicily into the eastern Mediterranean. Therefore, Nelson, sending back three frigates to reconnoiter Toulon, kept on through the Straits of Messina for Greece. Touching there, he received no news of Villeneuve, but heard that France had broken off relations with Turkey. This made it look as if Villeneuve had gone to Egypt, but when he arrived at Alexandria, there was no news of the French. Nelson hurried back to Sardinia. Arriving there about the beginning of March, he heard that Villeneuve was back in Toulon. Provisioning his ships, he was back off Toulon on March 13 with all his ships of the line. Nelson had acted in accordance with sound strategic principles. He had left nothing to chance and had made no blow in the dark where failure to find the enemy would have disastrous results. He had gone to each threatened point in turn with his whole force, and had waited at each point until he could eliminate one of the enemy's possible courses of action. When he finally proved that the French squadron had not passed the line Corsica-Sardinia-Tunis, then he had gone back to Toulon. If Villeneuve had not been there, his next move would have been to have left the Mediterranean in pursuit. When we see that, even though Nelson acted correctly, Villeneuve, if he had been able to have kept on through the Straits, would have gained a start of two months, we have an additional proof of the value of the initiative and of the time required for the defender to counter the move of the attacker. Even as it turned out, Villeneuve, by a mere feint at a move, had been able to send Nelson completely around the Mediterranean.

Ganteaume's orders, which were probably never intended to be executed, were countermanded.

Napoleon's first plan had failed. Its greatest weakness was that it required two squadrons to break their blockades almost simultaneously. In order to have reasonable chances of success in breaking the blockade, which was very efficiently maintained by the English squadrons, a squadron required very favorable weather, usually a storm with a favorable wind. It would very rarely happen that two widely divided squadrons would both have these



NELSON'S FIRST MEDITERRANEAN CRUISE, 1805.

favorable conditions at nearly the same time, and still more unlikely that both would escape without mishap, because the very gale which would allow them to escape would be liable to cause them very severe damage. Thus if one squadron had one chance in two of escaping in favorable weather, there would be but one chance in four for two squadrons to escape simultaneously, even if each had favorable conditions. But as one squadron would usually have to sail under unfavorable conditions, there would be about one chance in six for the success of the combination.

In this case luck had favored the French, as Graves had been off his station, and as each squadron had favorable weather, but still the odds were too great and the combination had failed on account of the damage the storm had inflicted upon Villeneuve's squadron.

But if the combination had failed the success of Missiessy had a certain advantage. He had a month and a half to operate in the West Indies before he would be opposed by superior forces. He had drawn away from the most important area, the Channel, Cochrane with his seven units, which were not to return during the campaign. Missiessy himself had plenty of time to return to France to take part in the major operation, or he might fill a part in it by waiting on his station, to join Ganteaume and Villeneuve. Thus the first operation had slightly improved the situation for Napoleon's major operation against England.

[TO BE CONTINUED]

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE FOUNDING OF OUR NEW NAVY

By REAR ADMIRAL CASPAR F. GOODRICH, U. S. Navy

In the early eighties of the last century, the navy of the United States had almost disappeared. What was left of it in ships was rapidly passing away through the operation of the laws prohibiting repairs to its vessels when the estimated cost was, at first, 25 per cent, then, later, 10 per cent, that of a new vessel. Yet out of the ashes of the old wooden navy arose the modern steel navy. To whom is the credit due for the manner of this re-birth? To this question I am, possibly, the only living person who can supply the answer.

When President Garfield assumed office he appointed Judge William H. Hunt, of Louisiana, Secretary of the Navy. The latter was appalled by the condition and paucity of the ships under his charge. In the spring or early summer of 1881, Secretary Hunt invited the late Rear Admiral Bancroft Gherardi, U. S. Navy, then a captain, to accompany him on a trip from New York to West Point (as I remember) on a government tug. Gherardi, at that time on duty at the New York Navy Yard, was an old acquaintance of Hunt's, both coming from New Orleans. In addition to the pleasure of Gherardi's company—and he was a most delightful man in every way—Hunt sought a quiet opportunity to obtain, from this friend, in whom he had full confidence, a word of advice as to what should be done to restore the navy to a sound state. In fact, after explaining the desperate situation and his earnest desire to remedy it, he plainly asked Gherardi what, in his place, Gherardi would himself do, and expressed his entire readiness to be guided by such counsel.

In effect Gherardi replied as follows: "Mr. Secretary, I do not feel either willing or competent to suggest exactly the steps you ought to take to accomplish your excellent purpose. Of course, I have my own opinions and, if you wish them, they are freely at your disposition, but I do not feel that it is well

that you should be influenced by any one person, no matter how firm his convictions and wide his experience. You have honored me by asking what I should do were I in your place—a very different matter. In that case, I should trust to no single individual, but would form a board composed of the ablest available officers of the line, the engineer corps and the construction corps. To this board I would refer the whole subject, both as to general policy and types of vessels required. In this way I would get the benefit of the best brains in the service, after which, I should adopt the recommendations of this body of experts and seek to carry them out. I should then be able to move in the full assurance that I was doing the very best thing possible.”

Such, in substance, is the story I heard from Gherardi's own lips soon after the occurrence of the episode here related.

It is of common knowledge that what Gherardi suggested, Hunt did. With President Garfield's approval he formed the first advisory board. Rear Admiral John Rodgers was its president. To Rodgers were joined eight other line officers; three engineers, Isherwood, Loring and Manning; three constructors, Lenthal, Wilson and Hichborn. Their report formed the basis of the navy's reconstruction.

The excellent work of Secretary Chandler and the second naval advisory board, authorized by the Act of 1882, the far-seeing vision of Chandler's successor, Secretary Whitney, which made possible the establishing of an armor plant at Bethlehem, etc., are all matters of history. While recognizing the wisdom of Secretary Hunt in going to a trustworthy source for counsel and in acting promptly and forcefully upon that counsel, in justice to the memory of my dear and modest friend I claim that the admirable manner in which the navy of to-day took practical shape is, unquestionably, due to my old commander, Bancroft Gherardi. He it was who planted the seed from which has grown this mighty tree.

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A NEW METHOD OF USING ALTITUDE AND AZIMUTH
TABLES TO OBTAIN A SHIP'S POSITION AT SEA

By LIEUTENANT ABNER B. CLEMENTS, U. S. N. R. F.

Class of 1879, U. S. N. A.

In the old navigation we worked our sights solely for longitude and latitude. We took a set of sights for latitude either on the meridian or near the meridian or at a known time from the meridian and reduced it to the meridian, or we took a set of sights of a body on the prime vertical or near the prime vertical, and, assuming a latitude, worked out the corresponding hour angle and thence the longitude.

After discovery of the Sumner line we saw that our sights did not give us the true positions that we thought they did. That the latitude sight did not give us an exact latitude unless the body observed was exactly on the meridian, that if off the meridian the result was affected by our guess as to the longitude. And, that our longitude sight gave us longitude only when the body observed was exactly on the prime vertical, otherwise the longitude obtained depended largely upon our guess at the latitude.

The new navigation took into account all this, and is founded upon the fact that an altitude of a celestial body simply gives us the radius of the circle upon which is located the observer. Bearing in mind that when this radius is over 10° of arc, such a portion of the circle as may include all possible positions of the observer is to all practical purposes a straight line, the new navigation treats it as a straight line, at right angles to the line of bearing of the observed body, since the arc of a circle makes a right angle to the radius at every point; and plots the position on the chart, or computes the position from the length of this radius, which is the zenith distance of the observed body. If the earth were a plane, or if we had a chart of the earth on which we could lay off

this distance as a straight line, we could plot the position of the observed body by its hour angle from Greenwich and its declination as though these were terrestrial longitude and latitude, and with the zenith distance as a radius lay off the line of position at once without computation. But as this would require a chart about 60 feet square it is impracticable. The best we can do is to compute, or in some other way arrive at, and plot a part of a circle with a radius approximating to the observed zenith distance and then lay off on the line of bearing the difference between this approximate radius and the true radius or observed zenith distance.

In the method of Saint-Hilaire we assume a position, and with this position as one point and the position of the observed body determined by its declination and Greenwich hour angle as the other, we can compute the great circle distance between the two. The difference between this distance and the observed distance shows us how much our assumed position is in error, and we then lay off from our assumed position the amount of this error, on the line of bearing of the observed body, taking the direction of the line of bearing from the azimuth obtained from observation or from the Azimuth Tables.

The method of Saint-Hilaire utilizes tables of haversines in this computation and by avoidance of plus and minus signs relieves the solution from ambiguity, but otherwise it has no advantage; in fact, some disadvantage as compared with the old altitude and azimuth problem and which gave both the altitude and the azimuth in one solution.

The so-called newest navigation of de Aquino is a republication by him with improved methods of use of the tables of Sir William Thompson, afterwards Lord Kelvin, for the ready solution of the old altitude and azimuth problem.

The old way of solving the altitude and azimuth problem was by Napier's rules, which were, that in a right-angled spheric triangle if we consider that triangle as made up of only five parts ignoring the right angle, these parts being the two sides, the complement of the hypotenuse and the complements of the two oblique angles, the sine of the middle is equal to the product of the tangents of the adjacent parts or the product of the cosines of the opposite parts.

Since these rules are general, we see we can go around a right-angled spheric triangle as we please, choosing any part as the

middle part, and the above proportion still holds so long as we are careful to observe the relation of adjacent parts and opposite parts to the middle part.

To solve an oblique-angled spheric triangle then, we simply divide it into two right-angled spheric triangles and solve by Napier's rules.

In the solution of the old altitude and azimuth problem we dropped the perpendicular from the observed body upon the meridian passing through the observer and solved by the formulæ obtained from Napier's rules:

$$\sin (90^\circ - t) = \tan \phi \tan d, \text{ whence } \tan \phi = \cot d \cos t. \quad (1)$$

$$\left. \begin{aligned} \sin h &= \cos a \sin (L + \phi) \\ \sin d &= \cos a \cos \phi \end{aligned} \right\} \text{ whence } \sin h = \sin (L + \phi) \sin d \sec \phi. \quad (2)$$

$$\left. \begin{aligned} \cos (L + \phi) &= \tan a \cot Z \\ \sin \phi &= \tan a \cot t \end{aligned} \right\} \text{ whence } \cot Z = \cos t \cos (L + \phi) \operatorname{cosec} \phi. \quad (3)$$

Sir William Thompson about 1876 published a table giving the values of parts of right triangles for each even degree, and published a method of using them substantially the same as method I of de Aquino.

Lieutenant de Aquino carried the tables to 30' on the perpendicular, and provided columns for the interpolation and used the letters of astronomical triangle and carried them in various combinations showing the various ways in which the tables could be used, instead of leaving the K and Q of Lord Kelvin and the application to be worked out by the navigator in each case. However, the manner of using the tables was essentially the same, and both followed the old altitude and azimuth problem and dropped the perpendicular from the observed body upon the meridian of the observer. In the old altitude and azimuth problem the perpendicular was dropped in this way, because of greater convenience in calculation. The rule was that the perpendicular should be dropped from the end of a given side and opposite a given angle, and generally to be so dropped as not to split a wanted part. Consequently, as the position angle was not wanted and the azimuth was, the perpendicular was so dropped as to split the position angle and not the azimuth. But when the calculation is not to be made, as in the use of the tables of Lord Kelvin and Lieutenant de Aquino, the reason for dropping the perpendicular in this manner no longer holds.

The tables published as Table VI in H. O. 200, and there credited to Lieutenant Radler de Aquino, were published about 1876 by Lord Kelvin, then Sir William Thompson. Lieutenant de Aquino merely devised a more convenient way of using them. The following is an explanation of a much more convenient way than that given by either Lord Kelvin or Lieutenant de Aquino:

Table VI of H. O. 200 is a table of right-angled spheric triangles. The special use of such tables is in the solution of oblique-angled spheric triangles, the oblique-angled spheric triangle being divided into two right-angled spheric triangles by means of a perpendicular let fall from the end of a given side and opposite a given angle.

In the method of Lord Kelvin and in the various methods of Lieutenant de Aquino, the astronomical triangle is divided into two right-angled spheric triangles by dropping a perpendicular from the observed body upon the meridian of the observer.

It is, however, more convenient to drop the perpendicular from the zenith upon the meridian passing through the observed body, even though this violates the rule against dropping the perpendicular so as to split a wanted part.

Fig. 1 represents the astronomical triangle projected upon the plane of the horizon. Then, using the ordinary notation of navigation, PZM_1 , PZM_2 , PZM_3 and PZM_4 represent the various cases that may arise.

In PZM_1 , the hour angle is greater than 90° :

$$mM_1 = mP + M_1P = 90^\circ - b + (90^\circ - d) = 180^\circ - (b + d),$$

and the angle $PZM_1 = mZ M_1 - MZP = \beta - \alpha$.

In PZM_2 , mP is greater than M_2P , $d > b$:

$$mM_2 = mP - M_2P = 90^\circ - b - (90^\circ - d) = d - b,$$

and the angle $PZM_2 = mZP - mZM_2 = \alpha - \beta$.

In PZM_3 , mP is less than M_3P , $b > d$:

$$mM_3 - M_3P - mP = 90^\circ - d - (90^\circ - b) = b - d,$$

and the angle $PZM_3 = mZP + mZM_3 = \alpha + \beta$.

In PZM_4 , where the declination is of opposite sign to latitude mP is less than M_4P , $b > d$ (regarding d as negative):

$$mM_4 = M_4P - mP = 90^\circ - d - (90^\circ - b) = b - d,$$

and the angle $PZM_4 = mZP + mZM_4 = \alpha + \beta$.

Whence we have the rules :

1. Where t is greater than 90° (enter the table with $180^\circ - t$) :
 $C = 180^\circ - (d + b)$ and $Z = \beta - a$.
2. Where t is less than 90° and $d > b$: $C = b \sim d$ and $Z = a - \beta$.
3. Where t is less than 90° and $b > d$: $C = b \sim d$ and $Z = a + \beta$.

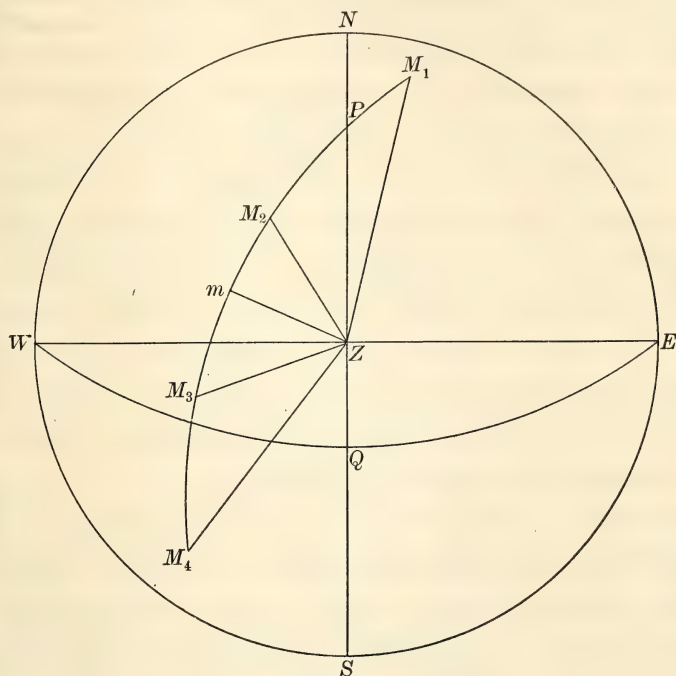


FIG. 1.

$$PZ = 90^\circ - L.$$

$$PM_1, PM_2, PM_3, PM_4 = 90^\circ - d.$$

$$Pm = 90^\circ - b.$$

$$mM_1, mM_2, mM_3, mM_4 = 90^\circ - B = C.$$

$$ZPM_1, ZPM_2, ZPM_3, ZPM_4 = t.$$

$$PZm = a.$$

$$mZM_1, mZM_2, mZM_3, mZM_4 = \beta.$$

An easy way to apply these rules is to note that if we always regard the declination as measured from the upper branch of the equator, then in all cases $C = b \sim d$, and we have the single rule:

When the hour angle is greater than 90° take $180^\circ - t$ instead of t and $180^\circ - d$ instead of d ; then, $C = b - d$. β has the sign of C and $Z = \alpha + \beta$.

Z is always measured from the elevated pole regardless of sign, to the east or west as the hour angle is the east or west.

By this method we reduce the four cases and four rules of de Aquino to a single case and a single rule, and we are able as the first step and without interpolation to take out the latitude and hour angle which give us the plotting position, and we get the declination of the foot of the perpendicular and the first part of the azimuth on the same line in the table also without interpolation. The declination of the foot of perpendicular is in even degrees, so we combine it with the declination of the observed body mentally and get C ($C = b - d$), which we find at the same opening of the page and next to the second part of the azimuth. As both parts of the azimuth are in degrees and tenths we combine then mentally ($Z = \alpha + \beta$) and plot the line of bearing with this azimuth through the plotting position, then in the same line we take out the altitude by a simple interpolation in the same column in which we found the latitude and lay off the difference between it and the true altitude at once on the line of bearing.

The method of using the tables is as follows: Regard d as the latitude and Z as position angle, α and β as the two parts of the azimuth. Enter the tables from *below* with the nearest value to the dead reckoning latitude as d and hour angle as t and take out α to the nearest $30'$. Re-entering the tables from *above* with this α , take out the nearest latitude (in d column) and hour angle without interpolation, these give the assumed position to be used instead of the dead reckoning position. On the same line with these take out b and a , combine b with the declination ($C = b - d$) and obtain C . From C by a simple interpolation get h_c and β and combining α and β get Z , the azimuth. Comparing calculated altitude h_c with the observed h_o gives the altitude difference, which is laid off from the assumed position on the line determined by the azimuth either toward or away from the observed body, as the observed altitude h_o is greater or less than the computed altitude h_c . Then draw a line of position or Sumner line at right angles to the line of bearing.

Example 1.—January 11, 1918, a. m., sextant altitude of sun's lower limb, $12^\circ 10' 40''$ bearing S. and E.; W. T., $8^h 53^m 06^s$;

C—W, $7^h 55^m 50^s$; C. C., $1^m 55^s$; height of eye, 18 feet; I. C. + $1' 30''$; approximate position, latitude 38° N., longitude $122^\circ 16'$ W.

SOLUTION IN DETAIL

W. T. obs. + 12 hrs.	$\begin{array}{r} h \\ 20 \end{array} \begin{array}{r} m \\ 53 \end{array} \begin{array}{r} s \\ 06 \end{array}$	Dec.	$21^\circ 51.8'$
C—W	$\begin{array}{r} 7 \\ 55 \end{array} \begin{array}{r} 50 \end{array}$	Corr.	.3
C. C.	$\begin{array}{r} 1 \\ 55 \end{array}$	C. Dec.	$21^\circ 51.5' S.$
G. M. T.	$\begin{array}{r} 4 \\ 47 \end{array} \begin{array}{r} 01 \end{array}$		
Eq. T.	$\begin{array}{r} 7 \\ 56.2 \end{array}$		
G. A. T.	$\begin{array}{r} 4 \\ 39 \end{array} \begin{array}{r} 04.8 \end{array}$		
G. A. T. arc	$69^\circ 46' 12''$		$69^\circ 46' 12''$
Long.	$122 16$		
Local H. A. = t =	$52^\circ 30' E.$	Tab. H. A.	$52^\circ 16' E. (p. 253).$
$a = 38^\circ 30' (p. 253).$		{ Longitude	$122^\circ 02' 12'' W.$
		{ Latitude	$38^\circ 05' (p. 253).$
Obsd. alt. \odot	$12^\circ 10' 40''$		
I. C.	$\begin{array}{r} 1 \\ 30 \end{array}$		
Corr.	$\begin{array}{r} 7 \\ 54 \end{array}$		
h_o	$12^\circ 20' 04''$	$b = 52^\circ (-253) \alpha = 51.8 (p. 253).$	
h_o	$12^\circ 20.1'$	$d = 21^\circ 51.5'$	
h_c	$12^\circ 34.4' (p. 252).$	$C 73^\circ 51.5' \beta = 79.9 (p. 252).$	
$h_c - h_o$	$14.3'$ away on line of bearing, $Z = 131.7'.$		

With latitude 38° in d column find $a 38^\circ 30'$ corresponding to $t 52^\circ 30'.$

Then with $a 38^\circ 30'$ at top of page take out $38^\circ 05'$ and $52^\circ 16'$, the latitude and hour angle of plotting position, and opposite them note $a = 51.8'$ and $b = 52^\circ$, which, combined with declination $21^\circ 51.5'$, gives $C = 73^\circ 51.5'$. Opposite $C 73^\circ 51.5'$ by interpolation take out $h_c = 12^\circ 34.4'$ and $\beta = 79.9^\circ$, then the difference between the true altitude and h_c is the altitude difference $14.3'$ to be laid off from plotting position away from sun on line of bearing, $Z = 131.7^\circ.$

It will be seen that all this requires no computation, but will be done by the navigator mentally at one opening of the tables when he is ready to plot his position on the chart.

Example 2.—May 23, 1918, during p. m. twilight; sextant altitude of star α Leonis (Regulus) is $66^\circ 18.2'$ bearing S. and W.; W. T. obs., $6^h 45^m 18^s$; C—W, $4^h 18^m 02^s$; C. C., $-3^m 45.5^s$; I. C., o.o; height of eye, 39 feet; dead reckoning position, latitude $34^\circ 38' N.$, longitude $65^\circ 12' W.$

SOLUTION IN DETAIL

W. T. obs.	^h 6 ^m 45 ^s 18 W.				
C. W.	4 18 02				
C. C.	— 3 45.5			R. A. M. S.	^h 4 ^m 01 ^s 09.2
G. M. T.	10 59 34.5			Corr.	1 48.3
R. A. M. S.	4 02 57.5			R. A. M. S.	4 02 57.5
G. S. T.	15 02 32.0				
R. A.	10 04 02.6				
G. H. A.	4 58 29.4				
G. H. A. arc	74° 37' 21"	G. H. A. arc	74° 37' 21"		
Long. W.	65 12	ta	9 44		
t_{DR}	9° 25' 21"	{	Long. ^a W.	64° 53' 21"	
$a =$	8°		Lat. ^a N.	34 37 00	
Obs. alt.	66° 18.2'				
Corr.	6.6	Dec.	12° 21.9' N.		
C. alt.	66° 11.6'	$b =$	35	$a =$	84.4°
h_c	66 03.4	$C =$	22° 38.1'	$\beta =$	71.5
$h_o - h_c$	8.2'	towards on line of bearing, $Z =$	155.9° W.		

With latitude $34^\circ 30'$ in d column at bottom of page find a $8^\circ 00'$ opposite t $9^\circ 30'$ (p. 248). Then with a $8^\circ 00'$ at top of page 212 take out $34^\circ 37'$ latitude $h \setminus d$ column and $9^\circ 44'$ hour angle in $Z \setminus t$ column the latitude and hour angle of plotting position, opposite them note $a = 84.4$ and $b = 35^\circ$; combine b with d and get C , $C = b \sim d = 22^\circ 38.1'$ and corresponding to this value of C find $\beta = 71.5$ and $h_c = 66^\circ 03.4'$, page 213. The difference between this $h_c = 66^\circ 03.4'$ and the observed $h_o = 66^\circ 11.6'$ is $8.2'$ which lay off towards the star on bearing $Z = a + \beta = N. 155.9^\circ W.$, and draw line of position at right angles to that bearing.

In practical work the navigator will, after obtaining his approximate hour angle and corrected altitude and declination, take his tables and plotting chart, and following down the column headed a in the tables he will take out the latitude and hour angle and plot the plotting position, then noting a , will run up the C column with $b - d$ and note β which he will combine with a mentally and draw the line of bearing, then opposite C in $h \setminus d$ column he will interpolate for h_c , which, compared with his corrected altitude, will give the altitude intercept which he will lay off on the line of bearing and he will then draw the Sumner line or line of position through the point thus obtained at right angles to line of bearing.

If the navigator wishes to report his position immediately after taking his sight, he can assume a watch time of observation and with this compute the hour angle and approximate latitude, and enter the tables and plot his line of bearing on the chart. Then applying the corrections for the observed altitude to the altitude taken from the tables with opposite sign, he is ready to lay off his altitude intercept immediately after taking sight without other calculation than a simple subtraction to get the difference between the observed and computed altitude.



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AN INTERPOLATING INSTRUMENT TO EXPEDITE
THE USE OF AQUINO'S TABLES
IN NAVIGATION

By LIEUTENANT (J. G.) ALEXANDER FORBES, U. S. N. R. F.

The following is a description of a simple instrument made to facilitate interpolation from mathematical tables. Although the particular instrument which has been made as a sample was designed primarily for the purpose of saving time and calculations in determining line of position by Aquino's method, the principle applies just as well to interpolations in the use of other tables, such as logarithms, etc.; and indeed the sample instrument can, by the addition of one or two spare parts, be adapted to any tables in which interpolation is needed, provided the function be virtually linear.

The particular reason for developing this instrument in its present form and for describing it as an adjunct to navigation is as follows:

Aquino's method has been recommended by Commander G. R. Marvell, U. S. N. (U. S. NAVAL INSTITUTE PROCEEDINGS, March, 1910), who found in it a saving of time, when compared with the Saint-Hilaire method as commonly used, amounting to $3\frac{1}{2}$ minutes; it has also been officially recognized to the extent that the method is explained and the tables are reprinted in H. O. No. 200, "Altitude, Azimuth and Line of Position," published by the Hydrographic Office of the navy. In practicing this method I found in the interpolations a considerable delay which I believed could be largely eliminated by this new contrivance. The additional saving of time, it seemed, might commend the Aquino method as more than ever worth adopting, especially if the present activities of our ships are such that rapid determination of line of position would be of practical value.

On page 190 of H. O. No. 200, the "First Method" of using Aquino's tables is explained; this appears to be the easiest of the three methods to master. The procedure is simple and rapid up

to the point at which the value of a to the nearest $30'$ is taken out. The next step is as follows: "Reentering the tables from above with this a and with the given d , by a simple interpolation the corresponding values of b and t are obtained." There are here two distinct interpolations, one for b and one for t , which if carried out completely involve eight separate arithmetical processes—three subtractions, two multiplications, two divisions and one addition—and the writing down of over 50 figures. The use of a slide rule will expedite this work considerably, but there still remain the addition and subtractions. The interpolations could be reduced to their simplest terms and performed mechanically by the use of a simple contrivance based on the principle of similar triangles. A rough sample instrument of brass and wood was therefore constructed in a machine shop with the aid of a milling machine, and the saving of time and mental labor resulting from its use seemed to warrant its further development.

The essential elements of the instrument are: (1) A rigid right-angle triangle; (2) a graduated sliding scale or ruler, free to move right, left, up or down, but always parallel to one side of the triangle, similarly graduated; and (3) a rotating arm made of transparent material pivoted at the point of intersection of the other two sides of the triangle and with a ruled line on its surface passing through the pivotal point. Fig. 1 illustrates the construction. The three sides of the triangle may be designated the base, the fixed scale and the hypotenuse. The triangle is mounted on a board, and raised above its surface high enough to allow space for the moving parts beneath it. Also fastened rigidly to the board is a fixed groove or track, parallel to the base. In this track slides a short bar on which is mounted at right angles another groove or track in which slides the sliding scale. Since the fixed scale is perpendicular to the base, the sliding scale must be parallel to the fixed scale. The sliding scale moves under the triangle, leaving just enough space between for the motion of the transparent rotating arm. The entire length of the fixed scale represents 1° divided into $60'$. The sliding scale is twice as long, and bears on its right edge 2° divided into $120'$, each of the same length as $1'$ on the fixed scale. In this way it is adapted to the conditions obtaining in Aquino's tables. The graduation of the fixed scale is based on the fact that b is given in whole degrees. The graduation of the sliding scale is based on the fact that successive values of d never differ by more than 1° , and those of t

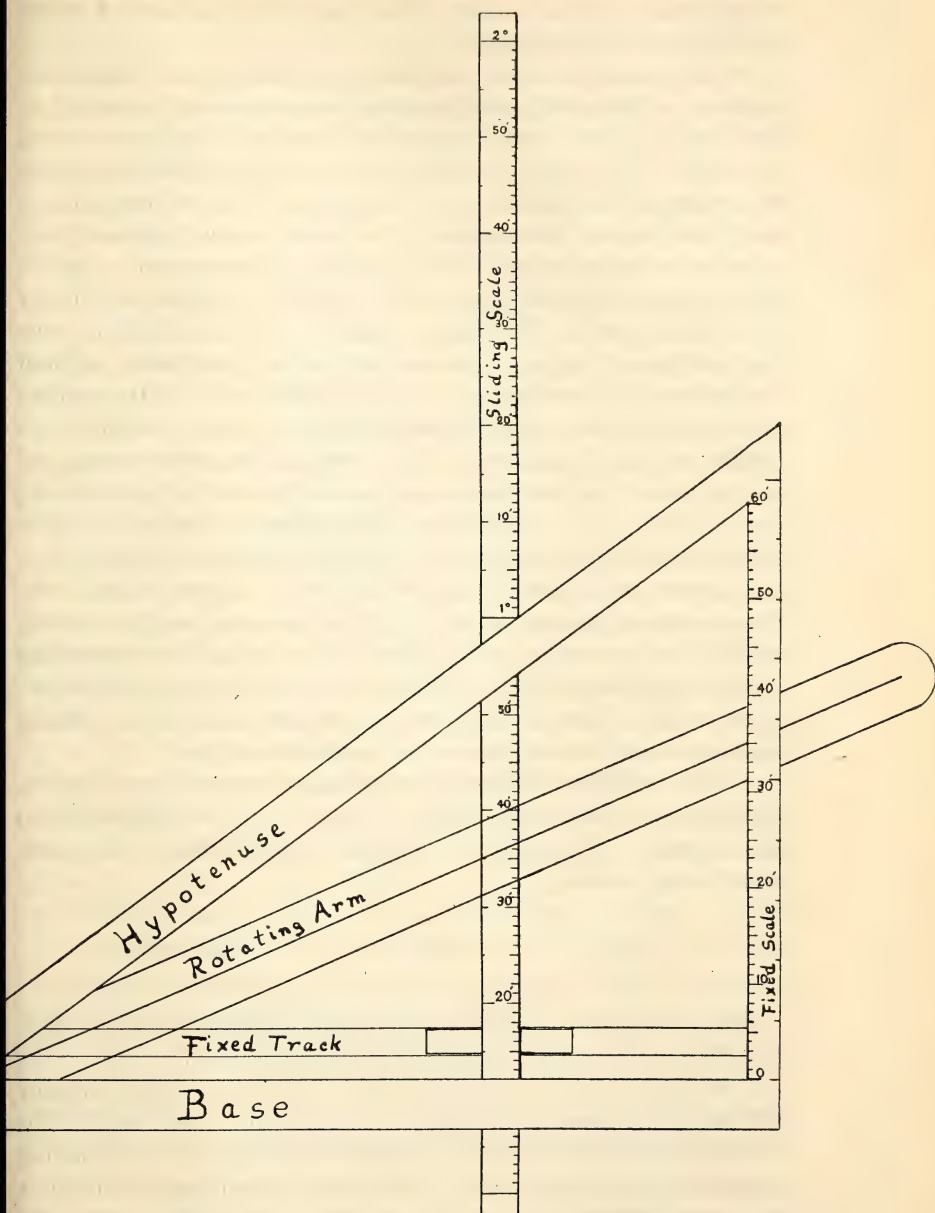


FIG. 1.

only do so in a small portion of the tables, the treatment of which will be considered presently.

In the operation of the instrument the sliding scale is taken to represent values of d , while the fixed scale represents values of b ; the sliding scale is then reset to represent t . The procedure is as follows: The values of d next above and below the given value are found in the tables. The sliding scale is moved up or down until the number of minutes in the value *below* the given value is at the intersection with the base; this number appears twice on the sliding scale, once in each of the two degrees; the lower should be selected. The sliding track (in which the sliding scale lies) is then moved to right or to left in the fixed track, without disturbing the up and down set of the sliding scale, till the number of minutes in the value of d *above* the given value is at the intersection with the hypotenuse. The rotating arm is then swung till the indicator line on its surface crosses the sliding scale at the given value of d . The indicator line will then cross the fixed scale at the mark which indicates the desired number of minutes in b , the number of degrees being given in the b column of the table. Then, without disturbing the set of the rotating arm, the sliding scale is reset according to the values of t in the table corresponding to the values of d below and above the given value, and the desired value of t is directly read from the point on the sliding scale at which it is intersected by the indicator line.

This procedure will perhaps be made clearer by an example. Suppose we have given $a=39^\circ 0'$, $d=21^\circ 11'$; the problem is to find b and t . The part of the table in which these values are found is as follows:

b	d	t
27°	$20^\circ 40'$	$42^\circ 16'$
28	21 24	42 32

The sliding scale is set so that the base intersects its right edge at $40'$ in its lower half (the bottom being assumed as $20^\circ 0'$, the middle point as $21^\circ 0'$, the top as $22^\circ 0'$), it is then moved laterally till the hypotenuse intersects it at $24'$ in the upper half. The rotating arm is swung till the indicator line intersects the sliding scale at $11'$ in its upper half. Then it will be seen that the indicator line meets the fixed scale at $42.3'$, thus giving $27^\circ 42.3'$ as the value of b . The sliding scale is then moved upwards till the base intersects it at $16'$, and to the left till the hypotenuse inter-

sects it at $32'$ in the same half of the scale (*i. e.*, the same degree). The indicator line now crosses the sliding scale at $27.3'$, showing the value of t to be $42^\circ 27.3'$. It will be seen from this that the entire operation of obtaining the values of b and t is performed with five simple motions, which with a little practice can be performed rapidly.

The accuracy of the instrument depends on the dimensions, the workmanship in construction, and the care with which it is manipulated. It is very easy to make an instrument of the dimensions of the sample, $7'' \times 5''$, or even smaller, accurate to less than $0.1'$. With such an instrument readings can be made to this degree of accuracy if care is taken in setting the scale and the rotating arm. In practical navigation, however, where an error of $0.2'$ or even $0.5'$ is unimportant, time can be saved by rapid setting of the moving parts, which can be done very quickly to the nearest half minute, and results good enough for the purposes of the navigator obtained with great speed.

Using the crude instrument, I have made comparative tests to determine the approximate saving of time. To this end a number of values of a and d were written down at random. The time was taken from the moment these values were looked at and the search in the tables begun to the moment the values of b and t to the nearest minute were written down in columns prepared for them. One series of 10 was done with the interpolation after very little practice, and another series of 10 using arithmetic; a third series of four was later carried out with a 10-inch slide rule. The results were as follows: Time with interpolator varied from 120 to 85 seconds, average 101 seconds; time with slide rule 2 minutes 55 seconds to 2 minutes 14 seconds, average 2 minutes 35 seconds; time with arithmetic, 6 minutes 27 seconds to 1 minute 50 seconds,¹ average 4 minutes. This shows a saving of time over the slide rule amounting to approximately 1 minute, and over arithmetic amounting to 2 minutes 20 seconds. The test, moreover, does not show the full possibilities of time-saving, since with practice one could greatly reduce the time required to operate the instrument; in my own case far more than would be possible

¹ The instance in which, without instruments, the procedure was completed in 1 minute 50 seconds was exceptional. In this case the figures were such that the answer was obvious on inspection and no written calculations were required. The next shortest time was 3 minutes 29 seconds.

with either of the other methods. With practice it should be possible to perform with the interpolator the entire operation (*i. e.*, beginning with the search in the table and ending with writing down the desired values) in a minute. I doubt if many could perform the same operation, using a slide rule, in less than 2 minutes, except in those cases in which the figures happen to be such that it can be done readily in the head. In short, it is possible with an instrument not much bigger or more expensive than a slide rule, to increase the saving of time by Aquino's method from $3\frac{1}{2}$ to $4\frac{1}{2}$ minutes.

It was noted above that in a small portion of the tables successive values of t differ by more than 1° , a fact which would make it impossible to use the scale as described in dealing with values in this part of the table. This difficulty is of minor importance as it never occurs when d is less than 45° and only in a minority of combinations when d is more than 45° . The only heavenly bodies used by navigators in the northern hemisphere whose declination exceeds 45° are Capella and four second magnitude stars including Polaris. Thus in the use of the sun, moon and planets this difficulty could not arise, and even in the use of these few stars it could arise only in a minority of observations. But most of this minority can be simply dealt with by engraving on the left-hand side of the sliding rule a different scale with smaller degrees and minutes, so that the space available may comprise more than 1° . For instance, this extra scale could be made to include 6° in its entire length, thus making a span of almost 3° available between the hypotenuse and base with the scale at the extreme right. This would adapt the instrument to declinations up to 71° , which would suffice for all the brighter stars except Polaris, and Polaris is usually treated with a different formula. It would be unwise to make the scale smaller for the sake of the insignificant number of instances in which the difference between successive values of t exceeds 3° , both because the minutes would be too small to read accurately, and because in this part of the table t is no longer a linear function of b .

It was mentioned in the beginning that this instrument could be readily adapted to interpolation with other tables than Aquino's, *e. g.*, logarithms and all the trigonometric functions. To this end there could be marked on the outer edge of that side of the triangle designated the "fixed scale" another scale in which the whole distance was divided into 100 parts instead of 60. To go

with this there could be supplied as many differently graduated sliding scales, to replace that described, as might be needed.

SUMMARY

An instrument is described, based on the principle of similar triangles, with which interpolations from mathematical tables can be performed mechanically with a minimum of labor. A sample has been made, designed especially for the interpolations required in Aquino's method of obtaining line of position. This method has been reported as saving $3\frac{1}{2}$ minutes when compared with the usual method of applying the Saint-Hilaire procedure. It is estimated that with the aid of this instrument at least a minute more could be saved.

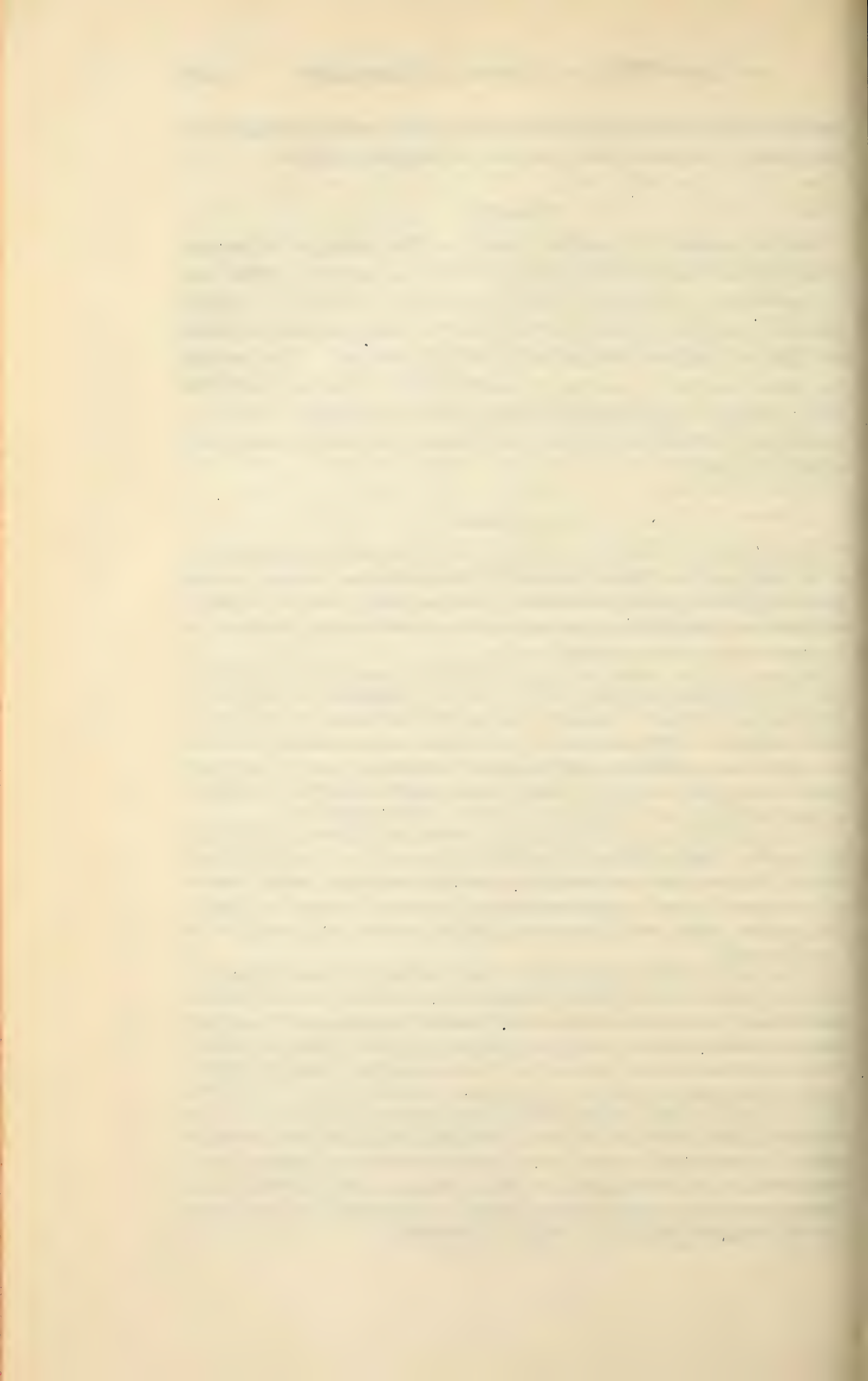
DISCUSSION

COMMANDER E. B. FENNER, U. S. Navy.—As an instrument for general use in the interpolation of linear functions Lieutenant Forbes' machine has the serious fault of requiring a number of different scales for use with different tables and the shifting of scales necessary would seem to deprive it of its one claim to value, increased speed.

For use with the Aquino tables this difficulty is practically non-existent and "for those who like that sort of thing, it is doubtless just the sort of thing they would like." Personally, I do not like the Aquino tables and have never been able to find the gain of $3\frac{1}{2}$ minutes in time claimed for them in a single sight, while in working out and plotting a cross of three star sights I have found that the Aquino requirement of plotting a different assumed point for each sight wipes out most of the gained time.

The Aquino method of computation is admittedly somewhat less accurate than the standard Marcq Saint-Hilaire formulæ, the plotting of long altitude differences necessitated by this method introduces further chance of error, and the use of the interpolating instrument seems to result in still another rather small inaccuracy, but the results are claimed to be "good enough."

In the past 10 years a multiplicity of new methods and new gadgets for use in navigation have appeared, practically all of which have involved a possible gain in speed and reduction of labor at the expense of a certain loss in accuracy, and it seems to me that this tendency should be checked. With the present size and value of our fleet units and the unavoidable difficulties of navigation under war conditions no amount of labor is too great if it will, even in slight degree, reduce the danger of catastrophe. If the multitude of odd jobs that have been piled on the shoulders of the navigator make it impossible for him to devote sufficient time to his primary duty, then some one else should take some of the odd jobs. One battleship is too large a factor in our battle strength to make "*good enough*" a proper motto for our navigators so long as "*better*" is practicable.



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USE OF UNIVERSAL DRAFTING MACHINE FOR
PLOTING DEAD RECKONING.

By LIEUT. COMMANDER G. M. BAUM, U. S. Navy

No doubt every navigator has had the usual race against time to work up his dead reckoning for a noon or near noon sight after a forenoon of maneuvering. The problem which confronts the navigator is the obtaining of an approximate dead reckoning position for an assumed point in the shortest time possible. The universal drafting machine offers a ready and simple solution.

The method described below is probably being used by many navigators, and no claim for originality therein is made. It is believed, however, that officers who may be ordered as navigators in the future may benefit by this description. Furthermore, no claim is made that it is the best method, but the writer has found it the best he has ever used.

First prepare a table giving the distance in miles and tenths of miles run for elapsed time of every minute from 1 up to 60, at speeds ranging from the lowest to the highest maneuvering speed of the ship. Paste this on a board or piece of cardboard for convenience.

The scales furnished to ships with the universal drafting machine are graduated on one edge in inches and tenths of inches, and on the other edge in inches and one-sixteenths of inches. For convenience, assume the scale to be one inch equals one mile. Use the scale graduated in inches and tenths of inches.

Have the quartermaster on watch keep an accurate record of all changes of course and speed, no matter how slight the change of course or short the time, in a loose-leaf notebook. The advantage of having a loose-leaf notebook lies in the fact that one or more leaves may be detached and sent to the navigator in the chart-house, and the record resumed on a new page, without breaking the continuity of the record.

Take an arbitrary point anywhere on the chart or plotting sheet, whichever is being used, off to one side and clear of the work, to represent the last plotted position or starting point. From this point lay down the distances run on the various courses, using the scale of the universal drafting machine. The scale is naturally larger than that of the chart or plotting sheet, but you are working with the scale of one inch equals one mile on the scale, and therefore must temporarily disregard the scale of the chart. No matter how short the distance run may be, the large scale enables its being plotted. Having plotted the track of the ship from the data in the notebook, lay the edge of the scale to cut the initial point and the point of the last plot. This gives the course made good. The distance between the two points is the distance made good, which can be readily read off in miles. Clamp the scale and move it to your last dead reckoning position and lay off the course made good. With dividers step off the distance made good, first converting the distance run, to the scale of the chart or plotting sheet in use.

The method outlined above does not take into account the advance and transfer on a turn, but these are comparatively so small that they may be disregarded.

U. S. NAVAL INSTITUTE

SECRETARY'S NOTES

Due to the limited number of essays and articles **Lack of** received for publication, it has been necessary to **Material** shorten that part of the PROCEEDINGS devoted to original subject matter.

The attention of all the members and the sub-
Prize Essays scribers to the U. S. NAVAL INSTITUTE PROCEED-
1919 INGS is invited to the new rules governing the Prize
Essay contest for 1919 under the heading of Special
Notice in this number. It is requested that authors who are writ-
ing or who contemplate writing essays submit them at their
earliest convenience, as the Institute is in pressing need of articles
for publication in the PROCEEDINGS.

The board of control invited the Chief of Naval
Topics Operations, Commanders-in-Chief of the U. S. fleets,
for Chiefs of Bureaus, Presidents of the U. S. Naval Insti-
Essays tute and Naval War College, and the Superintendent
of the U. S. Naval Academy to suggest topics for
essays. The suggested topics received to date will be found
opposite the Special Notice, and the list will be added to as the
suggestions are received.

Since March 36 regular members, 2 associate mem-
Member- bers and 1 life member have joined the Institute. Total
ship membership 4901.

Deaths:

Rear Admiral J. D. Ford, U. S. N., retired.

Civil Engineer C. A. Bostrom, U. S. N.

Resignations: One.

Several hundred copies of the PROCEEDINGS have
Address been returned, because of the lack of proper address,
of all members are urged to keep the Secretary and
Members Treasurer informed of the address to which PRO-
CEEDINGS are to be sent, and thus insure their receipt.

This precaution is now of particular importance as notices of changes of stations are not now available for the use of the Institute's staff.

Members and subscribers are urged to notify the Secretary and Treasurer promptly of the non-receipt of PROCEEDINGS, in order that tracers may be started. The issue is completed by the 10th of each month.

Dues It is requested that members who have not paid their 1918 dues of \$2.50, do so at their earliest convenience.

Book Announcements Due to freight embargoes, scarcity of paper and binding cloth and the drafting of many of the printers' experienced employees, the Institute is experiencing difficulty in supplying the demands for books published by the Institute. Every effort to fill the orders of members and subscribers is being made and will continue to be made. In cases where books are out of stock but are expected within 10 days time the orders are placed on file, otherwise the money is refunded.

Due to a delay in receiving the approved manuscript for the Landing Force Manual U. S. Navy 1917, the Manual will not be ready for issue until about August 1, 1918.

The Naval Artificer's Manual has been revised and will be ready for issue about June 15, 1918.

The revision of the "School of the Ship" has been delayed indefinitely.

Discount on Books The five per cent additional discount allowed to purchasers of books whose accounts during a calendar month amounted to a hundred dollars or over has been discontinued.

Book Department The Institute Book Department will supply any obtainable book, of any kind, at retail price, postage prepaid. The trouble saved the purchaser through having one source of supply for all books, should be considered. The cost will not be greater and sometimes less than when obtained from dealers.

The attention of authors of articles is called to the fact that the cost to them of reprints other than the usual number furnished, can be greatly reduced if the reprints are struck off while the article is in press. They are requested to notify the Secretary and Treasurer of the number of reprints desired when the article is submitted. Twenty copies of reprints are furnished authors free of charge.

Authors of articles submitted are urged to furnish with their manuscript any illustrations they may have in their possession for such articles. The Institute will gladly co-operate in obtaining such illustrations as may be suggested by authors.

Original photographs of objects and events which may be of interest to our readers are also desired, and members who have opportunities to obtain such photographs are requested to secure them for the Institute.

Members are invited to send to the Secretary comments, suggestions or criticisms on the make up of the PROCEEDINGS, and to submit topics for essays.

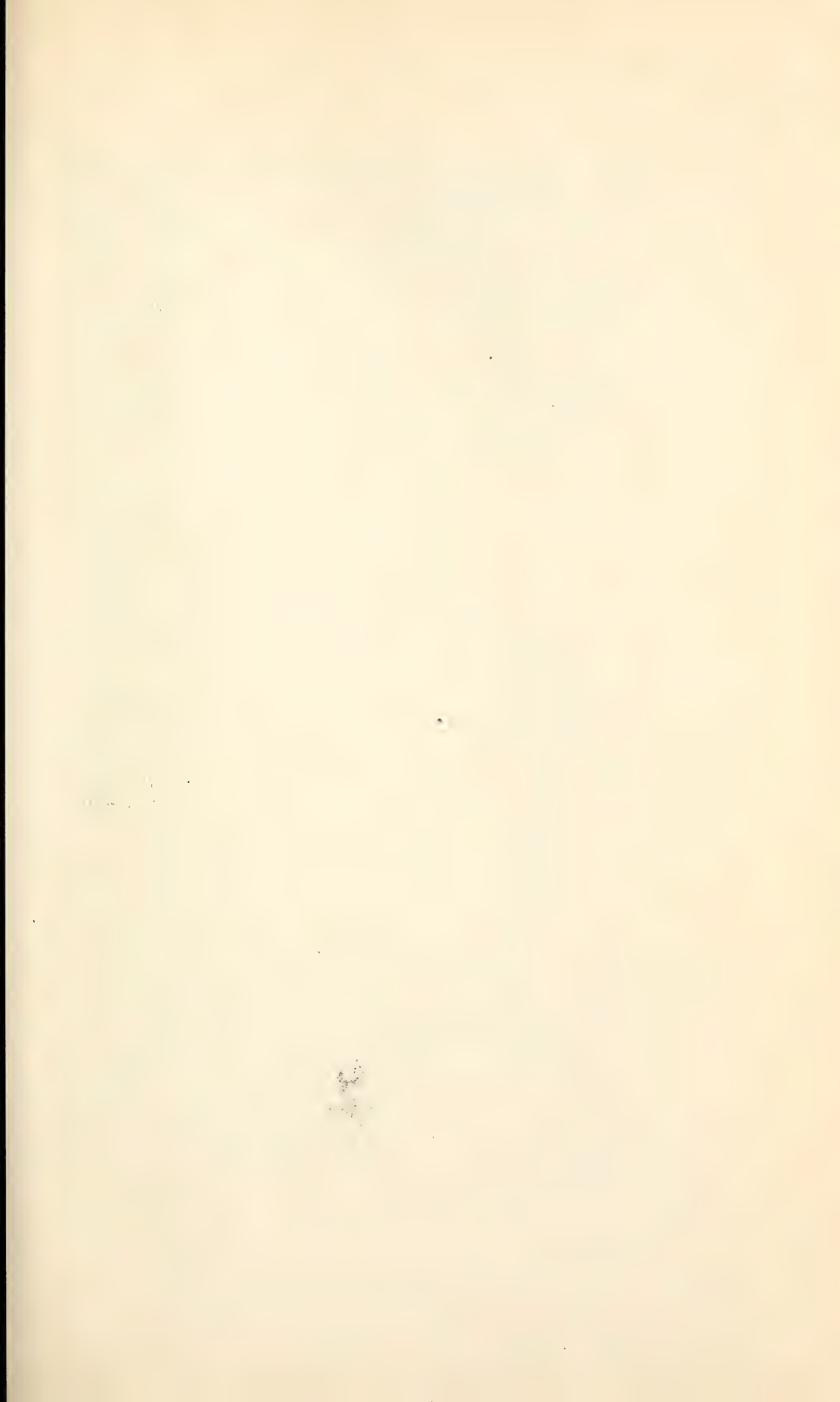
Whole Nos. 145, 146, 147, 149, 155 and 166 of the PROCEEDINGS (March, 1913, June, 1913, September, 1913, January-February, 1914, January-February, 1915, and November-December, 1916) are exhausted; there are so many calls for single copies of these numbers that the Institute offers to pay for copies thereof returned in good condition at the rate of 25 cents per copy.

ANNAPOLIS, MD., May 8, 1918.

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Through the courtesy of *Sea Power*.

PROFESSIONAL NOTES

PREPARED BY

LIEUTENANT WM. B. JUPP, U. S. Navy

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CHILE

TO RELEASE HUN SHIPS FROM CHILEAN PORTS.—The agreement which has been pending with Germany for the release of three of the German merchantmen which have been laid up in Chilean ports during the war has been completed. Germany has stipulated that the vessels must be used to carry cargoes only to neutral ports. Metals, saltpeter and other products will be exported.—*Star*, 5/3.

CHINA

CHINA TO SEND 40,000 TO FRANCE BY SUMMER.—Capt. Ting Chia Chen, military counselor to the President of China and also to the Chinese minister of war, has arrived here on a French steamship. He said that China now sending troops to France to fight for the Allies.

Captain Ting, who is a graduate of the United States Military Academy at West Point, for some time has been in Europe as a military observer in the war theater for his government.

"China is preparing to do her part in making the world safe for democracy," he said to-night.

"It is true that China has troops now on the way to the battle front, and it is the calculation of the Peking Government to have no fewer than 40,000 fighting men with the French by early summer. I have just left France, and there remained behind me ten other Chinese officers, whose duty it will be to select training camps in France for Chinese troops."

The captain added that there is a spirit among the Chinese people that Prussianism must be suppressed for the good of mankind and the advance of civilization.—*Ev. Star*, 30/4.

GERMANY

GERMANY BUILDS MINE-LAYING CRUISERS.—New mine-laying cruisers of 4000 tons displacement and a speed of 35 knots are among the recent additions to the German Navy according to reports. The figures given out are believed to be exaggerations, since a supply of 480 mines is said to be carried, each weighing close to a ton, and four 5.9- and eight 4.1-inch guns are also said to be the armament.

Sixty destroyers, it is declared, have been launched since the war was declared. Their speed is 34 knots and their armament is increased to three 4.1-inch guns and six torpedo tubes. Indications are that the German building program has made the navy stronger in every class save that of light cruisers than it was when war was declared.—*Naval Monthly*, May.

HEAR GERMANY HAS SIX SUPER-SUBMARINES.—Information received in an official quarter in Washington credits Germany with having completed the construction of six super-submarines of 1500 to 1800 tons capacity, with a cruising radius of 10,000 miles, and that six more U-boats of the same design are being rushed toward completion.

Germany has designed the newer submarines, it was said, to be superior to destroyers. It was said that the allied Admiralties have known for more than three months of the actual construction of these super-submarines, which, it is believed, follow on general lines the construction of the commercial U-boats, one of which, the *Deutschland*, visited the United States.—*N. Y. Herald*, 28/4.

GERMAN SUBMARINE WARFARE EXTENDED.—The Swedish Minister at Berlin has announced that Germany will sink all neutral ships, regardless of the flag they fly, if the country to which they belong has made a tonnage agreement with the Allies, or if the major part of the cargo is destined for an allied country.

Dutch, Norwegian, Swedish, Danish and Spanish ships are likely to be affected by this new decision. It will probably increase the number of total sinkings, but it is not thought that it will raise the amount of lost tonnage materially. Holland, Sweden and Denmark have been shipping little stuff in neutral bottoms to allied countries in many months. Norway and Spain, however, have been carrying on a considerable business.—*Nautical Gazette*, 11/5.

TEUTON COMMANDERS AT ZEEBRUGGE AND OSTEND DECORATED.—“In connection with the splendidly carried out defence against the British attempt to blockade Zeebrugge and Ostend and land at those ports,” says the *Berlin Vossische Zeitung* in its edition last Sunday, “a shower of orders has rained upon various persons. Commanding Admiral Schroeder has been decorated with the Swords of the Red Eagle of the First Class; Chief Berlet, of the General Staff of Marines, has been awarded the Red Eagle of the Second Class, with Swords, and Captain Schuette, commander of the batteries on the mole, with the Knight’s Cross of the Royal Order of Hohenzollern, with Swords.”

The newspaper says the Germans lost only eight killed and sixteen wounded in the fighting.

According to the *Amsterdam Telegraaf*, the German casualties were 300, of which 70 were killed or died of their wounds.—*N. Y. Herald*, 7/5.

GERMANY PLANS SEA RAID.—Germany is preparing for a vast sea raid supplementing her west front drive, according to information gathered officially by the navy.

While not verified, the reports were that unwonted activity is evident at the Teuton naval bases, and that all movements tended to show preparations for an offensive ahead of any allied smash.

The navy advices, similar in many respects to press messages out of Berne, may be German-inspired with a view to disturbing American-Allied morale. But, whether they are only German propaganda or not, they were regarded sufficiently plausible by navy authorities to take seriously and to prepare against such a drive.—*Naval Monthly*, May.

SAYS ALL REICHSTAG BACKS U-BOAT WAR.—Speaking during the naval estimates debate in the Reichstag Committee, Count von Westarp, the conservative leader, says a Berlin despatch, declared that with the exception of the independent socialists the committee was unanimous that the unrestricted submarine warfare must be continued by all means and in the sharpest manner.

They were agreed likewise, said the speaker, that the building of U-boats must be continued to the utmost possible limit, regardless of the duration of the war. This program must be followed out, because it was regarded as a means of attaining peace and making England submissive.—*N. Y. Herald*, 20/4.

SEIZING NEUTRAL SHIPS PRECEDENT SET BY GERMANY.—Vice Admiral von Capelle's attack on the United States and the Allies before the main Reichstag Committee, for what he called "the robbery of Dutch tonnage," caused State Department officials to call attention to-day to the fact that Prince Bismarck justified the action by Prussian troops in 1870 in seizing and sinking six neutral British vessels in the River Seine near Rouen.

Bismarck, in a note to Count Bernstorff, German Minister to London, under date of January 25, 1871, said:

"The case was one of necessity, which, even in time of peace, may render the employment or destruction of foreign property admissible, under reservation of indemnification. I take the opportunity of calling to mind that a similar right in time of war has become a peculiar institute, the *Jus Angariae*, which so high an authority as Sir Robert Phillimore defines thus:

"That a belligerent power demands and makes use of foreign ships, even such as are not in inland waters, but in ports and roadsteads within its jurisdiction and even compels the crews to transport troops, ammunition and implements of warfare."

Ship construction in this country has exceeded many fold American losses by submarines since the United States entered the war, Shipping Board officials said to-day in discussing the statement of Von Capelle.

It was emphasized that he made no such claim with respect to American shipping, which has suffered the loss of only three or four vessels since war was declared. Sinkings of American ships were more frequent when the United States was neutral and the ships went unarmed against attack. It was said to-day that no more than 40 merchant ships flying the American flag had been lost from all causes since the war began, nearly four years ago.—*N. Y. Herald*, 20/4.

BELIEVE GERMANY HAS STOCKS OF VANADIUM.—An analysis of fragments of shells flung by the German long-range guns into Paris, showing that the walls of the projectiles contained a considerable quantity of vanadium, has aroused speculation among steelmakers as to the German source of this important alloy. Moderate amounts of the metal are produced in Sweden from ores found there, but it had been supposed that importations from this source had been used by the Germans in building their submarines and other war engines requiring steel of the particular quality obtained by the use of vanadium as an alloy. It is estimated that the American Vanadium Company, through its mines in Peru, supplied more

than three-quarters of the metal which reached the world's markets before the war, and none of this is known to have reached Germany on direct shipments from the time when the allied navies began their rigid search for contraband on Europe-bound vessels.

The theory of steel men is that, in preparing for the war, Germany laid in large stocks of the alloy. In course of a discussion of the shells from the Teuton big gun, Joseph de Wyckoff, foreign sales manager of the American Vanadium Company, recalled that fully a year and a half before the outbreak of hostilities the Krupp management hinted that substantial amounts of vanadium were held in the company's storehouses.

The phase of the situation which interests the steel trade particularly is the ability of the German shellmakers to make use of this precious alloy for a special and not altogether effective purpose after nearly four years of war. Either the accumulated stock was much greater than was believed in 1914, or imports by secret channels have kept the supply abreast of the heavy demand. After the submarine *Deutschland* left this side on her second trip it was rumored that a large consignment of vanadium was aboard, and that in both trips the undersea cargo carrier took back 25,000 pounds of the metal. None of this had its source in the American Vanadium Company's mines, officers of the company state, and presumably was supplied from a store accumulated by German agents here.—*N. Y. Herald*, 3/5.

BOCHES PAVE WAY FOR ATTACK ON AMERICAN HOSPITAL SHIPS.—The German wireless, which recently sent out a despatch alleging that American aviators were crossing to Europe by hospital ships, reiterates the charges in a longer despatch. The reason for the emphasis placed on this false charge by the Germans, it is stated here, is probably that they are laying the foundation for justification at a later date of the torpedoing of the American hospital ships in case any such ships are put in the transatlantic service to carry home invalided soldiers. It may be recalled that similar charges were spread broadcast about British hospital ships, as a prelude to torpedoing them. The German wireless message says:

"American aviators are crossing to Europe as members of the Red Cross on hospital ships. This misuse of the Red Cross appears from documentary evidence found on American aviators who have been shot down. An American brought down in the region of the army of General Von Hutier carried a pass which referred to him as a member of the American Ambulance Service for France.

"Prisoners openly admit that it is the general practice for aviators to enter the American Ambulance Service for their passage to Europe and to cross on hospital ships. After they are landed in France they immediately transfer to the automobile corps and thence into the air service.

"The captured aviator referred to had, however, transferred directly from the ambulance service into the air service. Another carried a certificate in which the dates of several transfers were officially indicated."

[The British Admiralty already has denied the charge that American aviators were crossing on hospital ships, saying: "No hospital ship, British or American, has ever carried anybody but invalids and the necessary medical staff. The American naval authorities state that they have some few aviators who were in the Allied Ambulance Service in France before the United States came into the war, but even in such cases these men crossed the Atlantic in ordinary ships, taking their full chance of being torpedoed."]*—N. Y. Herald*, 3/5.

GREAT BRITAIN

BRITAIN MAY AUCTION HIGH PRICED SHIPS.—The London correspondent of the *Daily Post* says a suggestion of interest to ship owners is being made with regard to standard ships built and registered in the name of the Ship-

ping Controller and ships which have been bought at high prices for the Shipping Controller from other countries, notably the United States and Japan.

The ships eventually will be sold when the government goes out of the ship owning business, and it is suggested the vessels be put up at auction now and pass into the ownership of private firms, being treated exactly in the same way as ships requisitioned for the period of the war, which are used by the government, but remain the property of their original owners.—*N. Y. Herald*, 27/4.

SHIP LOSS REPORT MONTHLY.—*British Decide to Abandon the Weekly Bulletin*.—The Admiralty has announced the cessation of the weekly return of shipping losses and the substitution of a monthly report on the Thursday following the 21st of each month.

A table issued gives the losses of British, allied and neutral tonnage due to enemy action and marine risk since the beginning of 1917. The losses for the quarter ending in March, 1917, were: British, 911,840, and allied and neutral, 1,619,373. For the quarter ending in June: British, 1,361,370, and allied and neutral 2,236,934. For the quarter ending in September: British, 952,938, and allied and neutral, 1,494,473. For the quarter ending in December: British, 782,880, and allied and neutral, 1,272,843.—*Baltimore Sun*, 25/4.

HOLLAND

HOLLAND'S QUARREL WITH GERMANY.—Whether Holland is to be added to the list of nations at war is one of the big questions to-day. If she does come in, there appears to be no doubt that it will be on the side of the Allies. The reasons Germany is putting forth for her aggressive stand against this little country can be boiled down to the Dutch ship situation, now in a great measure controlled by the United States, and her need to use Dutch territory and Dutch waterways for the shipment of munitions and material to build up the intrenchments and embankments in Belgium. The second reason resolves itself into the sand and gravel controversy between Holland and Germany and between Holland and England. This dispute began in 1915, when it first came to the notice of the British Government that Holland was allowing Germany to ship military supplies through her country, thus violating the laws of neutral governments. In October, 1917, the British Government called Holland to task for allowing her waterways to be used by the Germans for the shipment of copper, sand and gravel used in building military posts and roads.

"The German Government have been and are being allowed to transport supplies required in connection with their military operations from their own territory to territory in German occupation, and *vice versa* across the territory of a state taking no part in the war," wrote Mr. Balfour. "The intention and result is materially to relieve the strain upon the railways and waterways of the belligerent country essential to its military operations. What is taking place constitutes a breach of the obligations incumbent upon a neutral state.

"If Germany finds it necessary for her own purposes to send commodities containing copper to Belgium to be smelted in order to extract the metal, and then to return the metal from Belgium to her own territory for use in her munition factories, the carriage of these supplies backward and forward, if permitted, via neutral territory, affords relief to the direct military transport system between Belgium and Germany and constitutes the use by Germany of Netherlands territory for military purposes. For the Netherlands Government to permit this to fail in the observance of their duties as a neutral.

"With regard to sand and gravel, it is immaterial whether the German purposes are alleged to be civil or alleged to be military. Germany is in occupation of Belgium merely in pursuit of military objects, and there can

be no purpose to which the sand and gravel so dispatched via the Dutch waterways can be put which does not constitute a use of those waterways for the forwarding by the enemy of supplies which are required in connection with the war.

"The sand and gravel which have been allowed to pass is far in excess of anything which is required for civilian purposes in Belgium. There is also the local output to be taken into account. Belgian quarries can easily produce all that is required for non-military purposes in that country. Since it is understood that the Belgian quarries are worked by prisoners of war, the output is doubtless used for civilian purposes. Were it not so it would be a breach of the Land War Regulations, since it would be a case of employing the labor of prisoners on work connected with military operations.

"His Majesty's Government feel no doubt that the Netherlands Government are allowing use to be made of Dutch territory by the Germans for the purpose of forwarding to Belgium in enormous quantities supplies which have intimate connection with the military defences of the German forces on the western front, and they certainly are not disposed to acquiesce in any arguments to the effect that the Netherlands Government are bound to allow the traffic either under the Rhine Convention or under any principle of international law or public right. On the contrary, they maintain that the Netherlands Government are bound to put an end forthwith to this transit traffic of the sand and gravel equally with that of the metals."

It seems that even as early as 1915 Great Britain had remonstrated on just these points, and in July, 1916, the Netherlands Government informed the British that it would limit the transit of sand and gravel to Belgium to 75,000 tons a month, all of which was to go for pacific purposes. Later this was increased to 450,000 tons a month. Officers were sent to Belgium to see how much of this material was being used for military purposes and how much for civil, but could make no calculation on account of being forbidden by the Germans to enter into military territory.

"When the matter was first raised in 1915 and 1916," Mr. Balfour continued, "the Netherlands Government felt great doubts as to the use of the sand and gravel transited across Holland. They thought it right to ask the German Government to be furnished with certificates as to the employment of the sand and gravel, and the German Government readily furnished them with 'scraps of paper' certifying that this sand and gravel was used for civilian purposes only. The Netherlands Government came to realize that it would not be right to attach very great importance to these certificates, and it was in spite of them that they decided in the summer of 1916 to restrict the transit of sand and gravel to 75,000 tons a month. It is true that the Netherlands Government subsequently altered their mind on the point, and after hesitation and obvious misgivings decided to continue to accept the certificates.

"Since the German occupation the fact is there has been little or no pacific use of Belgian roads, railways, or quays. Then there are the quantities of sand transited into Belgium, vastly in excess of any possible civilian requirements. Then there is the proof that such civilian requirements, if they exist, could be and almost certainly have been supplied from sources in Belgium itself. Next there is the certain knowledge that the German demands for these supplies for direct military objects, such as fortifications, is enormous, and there is the evidence that the concrete used for such fortifications is derived from material which comes from Germany—comes, that is, from the source from which the transited gravel comes, and not from Belgian quarries. And, finally, there is the direct sworn evidence that certain loads of sand and gravel, which had been transited, were, in fact, used for military objects."

Holland in due time took up this matter with Germany, and several weeks ago it was reported that Berlin and The Hague had come to an agreement on the question of the use of waterways. It was understood

that Germany had agreed to ship only as much building material as was necessary for civilian purposes. Now, however, it appears from the cable dispatches that Germany is considering the agreement as merely one of the many "scraps of paper" she has from time to time issued, and that she expects to take what she wants by the power of the mailed fist.

Holland has had due cause for war before this. Three weeks after America had entered the war the toll of American ships sunk by German submarines was 20, aggregating a tonnage of about 59,000. Up to the same date, neutral Holland, Germany's peaceful little neighbor, had lost 76 ships, amounting to about 150,000 tons, as well as a great number of lives. Yet Holland, with the fear, perhaps, of the fate of Serbia, Belgium and Rumania, did nothing. At the time of the sinking of her ships, Germany offered her not so much as an apology, but promised merely to compensate her at the close of the war.

Germany was not satisfied even with this attempt to cripple the industries and break the spirit of Holland. Many of the strikes and insurrections in the Dutch Indies have been traced to German intrigue.

Apparently the only reason Germany has respected the territorial integrity of the Netherlands up to the present time is that Holland has been extremely useful to her. Great quantities of sugar, coffee, cocoa, fish, butter, eggs, beef, cheese and even wheat have been shipped by the Dutch to Germany. Even when Holland was virtually starving and living on a close-ration basis, food was being smuggled into Germany. Much profiteering was going on openly in the little country. The German Government established a central buying office in The Hague and offered prices far above those that the Dutch people could pay. The Dutch Government could not, or did not, protest. There were riotings and strikes in the cities of the Netherlands. The reason given by the Dutch authorities for this state of affairs was that Holland had to send food to Germany or else freeze. Germany has been the only source of supply of coal to the Netherlands. The question whether Holland could have got fuel from the Allies is one widely discussed.

Another reason given for Germany's so-called respect of Dutch territory up to date is that Holland is useful to her as a neutral nation, in that she serves as a highly efficient and quiet flank cover on the north of German warfare in Belgium. By keeping up amiable relations with Holland, the Germans have had no need of protecting their lines of communication through Belgium to Flanders and France, except with border police and electric entanglements. Germany also has appreciated, perhaps, that Holland at war would be of benefit to the Allies, but it now seems that this consideration is no longer of great weight with the Teutons.—*N. Y. Times*, 28/4.

WHY GERMANY HESITATES TO MAKE A BELGIUM OF HOLLAND.—It has been asserted by Dutch officials in this country that Holland was fully aware that had Germany made war against France and England as a result of the Agadis crisis in the summer of 1911, not only Belgium, but also Holland, would have been invaded. There are said to be plans in the possession of the German General Staff for an attack upon England from the Dutch coast.

That the plan of 1911 was not executed in 1914 is said to be due to the fact that the German military strategists gave way to their colleagues, the tacticians, who pointed out that not only could no excuse be found for attacking Holland, but that the latter had really served Germany in making large concessions to the Vulkan company in June, 1914, for an extensive plant at Vlaardingen, near Rotterdam (only 115 miles from Harwich), and that in a political and commercial sense, as well as in a military one, it would be well to keep Holland as a neutral barrier until such a time as the new Vulkan yards at Vlaardingen could be availed of.

Germany has all along believed that the Dutch would be too much occupied with feeding the German armies and supplying German armaments to think of opposing by arms their best customer. From the very beginning of the war, however, the press of Holland, as well as the government itself, in a long series of diplomatic exchanges, has taught Germany otherwise.

The war caused a great dislocation of Dutch industries and an extra expense to the government, which up to June, 1917, had averaged \$35,000,000 a year.

To several interpellations made in the chamber as to whether the Dutch Army was adequately prepared, the General Headquarters issued a memorandum.

"Though it is inadvisable to make public information which might benefit a possible future enemy, there is no objection to furnishing data which will convince Dutch soldiers that they can face the prospect of war with confidence."

If their country were attacked from Germany, engineers who know Holland and its history, say there is no doubt that the Dutch would open the dykes and flood certain tracks which lie below sea level in order to secure protection of North Holland.

There are two main lines of inundation. The advanced positions toward Germany is known as the Grebbe line, and extends from the Waal, across the Rijn, through Amersfoort to the Zuider Zee.

The other, and by far the more important, line runs from Muiden, on the Zuider Zee, through Utrecht and Kuilenburg, to Gorkum, on the Maas. All this tract of country can be flooded by sections, and when the waters were spread over the face of the land a chain of forts, gristling with guns, would be left sticking out like islands to repel the invaders.

In that case the whole of the North of Holland would be turned into a vast island from the Maas to the forts of the Helder, at the narrow entrance to the Zuider Zee, if necessity arose, great stretches of this island could also be flooded by breaking down the seaward dykes to which Holland owes her very existence. The sacrifice would be great, but the Dutch press has recently been saying: "Liever bedorven dan verloren land"—Better a drowned land than a lost one.—*Baltimore Evening Sun*, 25/4.

DUTCH PRESS SNEERS MAY CAUSE AMERICA TO DROP GRAIN OFFER.—The United States is prepared to withdraw its recent offer of three ships to expedite grain to Holland, if the comment of Dutch newspapers, accusing the United States of duplicity in the condition that equal tonnage should leave Dutch harbors for America, is to be taken as indicative of the feeling of the Netherlands Government and people.

Officials expressed disappointment and surprise at the reception accorded to the offer of the United States, which based on a proposal of the Dutch Government to alleviate suffering from a shortage of breadstuffs. The offer was supplementary to President Wilson's statement of March 20, when the Dutch ships were requisitioned, that 100,000 tons of grain would be provided for Holland if ships were sent to carry it.

If Holland does not desire to take advantage of the offer to expedite the grain, the original offer to furnish grain still holds, but the time consumed in sending ships from Holland to America will delay the relief the United States is ready to grant.

Typical of the Dutch comment is an editorial in the *New Rotterdam Courant*, received by cable, as follows:

"In the last few days an official American communication has been received to the effect that three vessels, over two of which the American Government has no jurisdiction, will be allowed ultimately to leave for Holland on condition of the leaving of vessels of equal tonnage from Holland to an American port. This apparently friendly concession may

really be tightening of the noose, if, as has been suggested, it is an attempt to make Holland purchase three cargoes of grain with three conveyors. This would be a perfidious offer about which disappointment could not be too strongly expressed.

"We have not a high opinion of American good faith, but that official duplicity could go so far on promises made in black and white by the President of the United States, openly repudiated, it is impossible to believe. Such shamelessness has not been exceeded in this war. The American Government must give unambiguous guarantee that the President's promises of March 20 will be respected."

The condition that equal tonnage should leave Dutch waters for America when the grain steamship left was imposed to prevent an increase in the size of the fleet tied up in Dutch ports by the German submarine menace.—*N. Y. Herald*, 25/4.

RUSSIA

MUNITIONS AT KOLA SOUGHT BY GERMANS.—Germany is striving to get a big, fresh store of munitions piled up by the Russians at the port of Kola, according to War Department information. This is behind the offensive raging in Finland, a battle dwarfed by the west-front struggle, but still important from the fact that Germany has been forced to send more troops into Finland.

Three or four divisions have been thrown into Finland in recent days and other reinforcements had to be sent there previously. This is little compared to the numbers on the west front, but at the present stage one fresh division in the west could relieve three or four jaded divisions.

The Finnish map shows a "nutcracker" problem. To the north of Tammerfors are the White Guards, friendly to and aiding Germany. In the south the Germans came in from the Aland Islands, Hango and Lovisa. They now hold Helsingfors and Abo. Between the White Guards and the Germans are the Red Guards, Finnish Bolsheviki. Fighting gallantly, they have staved off the Whites and the Germans thus far, but the "nutcracker" is closing on them.

The War Department's information is that Germany intends to place one of the Kaiser's sons over Finland and that the Teutons intend to sweep across to the railroad which runs from Petrograd to Kola, and all-the-year warm water port, where vast Russian supplies were landed.

British marines recently landed there. They are intended to guard the munitions there just as the Japanese and British are keeping a watchful eye on supplies at Vladivostok, Siberia.

Army men praise the Red Guards' gallant defence and take some comfort from the fact that Germany is forced to send troops to Finland instead of drawing on that locality to reinforce the west front.—*Baltimore Evening Sun*, 19/4.

NO SIBERIAN CAMPAIGN NOW.—Those in Japan who favor Japanese intervention in Siberia found no encouragement in the words of Viscount Yasuya Uchida, former Ambassador at Washington, who, on his return here from his post as Ambassador to Russia, expressed doubt as to the wisdom of entering Siberia at this time. His conviction was that Bolshevism to-day represents the thought of a great majority of the Russian people.

The addresses of Count Terauchi, the Prime Minister, and Viscount Motono, the Foreign Minister, before the Diet recently are interpreted as indicating that Japan will for the present send no army into Siberia. Although nothing has been announced officially, the impression prevails that Japan has been influenced considerably by the attitude of the United States, which was that of doubting the practicability of Japanese intervention.

The Japanese campaign in Russia doubtlessly would depend on assistance from the United States as to war material, including munitions and air-

planes, and perhaps money. It is believed that Japan would hesitate to begin a war on Russian soil without the support of the United States, and that is why armed intervention is considered very doubtful at present. Should the situation change for the worse, the government will call a special session of the Diet to consider the matter. Meantime, the necessary military preparations are being advanced.—*Baltimore Sun*, 20/4.

ONE HUNDRED THOUSAND TEUTONIC CAPTIVES FOMENT SIBERIAN REVOLT.—German and Austrian war prisoners in Siberia are estimated at more than 100,000, and in official circles here it is held they constitute a grave menace to the allied position in the Far East. While the number of released prisoners bearing arms under the Bolshevik flag is not great, even a small number might prove a potent danger if permitted to become the organizing and directing force behind the Bolsheviks.

With German organization controlling the Bolsheviks, a huge army might be raised in Siberia. It is held here that such a force might necessitate the sending of a large Allies army to this theater.

Previous to the rise of the Bolsheviks to power and their subsequent peace negotiations with Germany, the Allies paid very little attention to Siberia. Since then little has been done to counteract enemy propaganda or German attempts to obtain control of the vast riches of Siberia when the war is brought to a close.

The greater number of the 100,000 prisoners are in Irkutsk and other large towns to the west, but in Priamuria—that part of Siberia which abuts on Manchuria and which has an outlet to the China Sea—there are between 15,000 and 16,000. These are in encampments at Habarovsk, Blagovestschensk, Nicholsk and other centers. The proportion of prisoners is three to one in favor of the Austrians. Five thousand of the prisoners in Priamuria are officers, most of them being in the camps at Habarovsk.

It is known that in Irkutsk and Western Siberia the Germans, especially the officers, are working with the Bolsheviks. Some released prisoners also are with the Bolshevik forces now fighting against General Semenov, the anti-Bolshevik leader in Eastern Siberia.

Those who have visited the prison camps say the officers and men keep themselves in excellent physical condition, believing a day is coming when their services will be needed in the Far East, and that a German force will come to their assistance over the Siberian Railway.

General Semenov is holding an important part of the Siberian Railway between Vladivostok and Irkutsk. His force, however, is small and his supply of arms and ammunition limited. Should the Germans and Bolsheviks work in unity they may break Semenov's hold on the railroad.

Allied sympathizers here declare that the only way to prevent the Austro-German prisoners from doing further damage is to support any movement that would enable the Allies to obtain control of the prison camps, or, better still, to have the prisoners removed to a safer locality.

A large number of escaped prisoners have come from Siberia into China and Mongolia by using passports purchased from the Bolshevik authorities. Some of these have been at work among the large Mohammedan population of the Chinese province of Sinkiang, while in Mongolia Bolsheviks and Turkish agents have been attempting to bring about an uprising against the government.—*N. Y. Herald*, 26/4.

KORNILOFF TROOPS FIGHT BOLSHIEVIKS.—Hostilities have been renewed between the troops of General Korniloff and those of the Soviets. Rostov-on-Don is in the hands of the anarchists. At Kherson, after the Germans left, massacres of officers and bourgeoisie by soldiers occurred. The Germans since have reoccupied the town.

Criminals at Novo-Tcherkask, who began to indulge in excesses, were dispersed by machine guns. The Turkish cruiser *Hamidies* and two torpedo-boats are reported to have arrived at Odessa. There was severe fighting between the White Guards and Red Guards north of Viborg.—*N. Y. Herald*, 22/4.

REFUSE TO FIGHT ALLIES.—The Germans are steadily withdrawing troops and sending them to France.

Polish citizens refused to enlist in a proposed Polish corps to fight against the Allies in Flanders.—*Baltimore Evening Sun*, 26/4.

SWEDEN

ONE HUNDRED AND SEVENTY-SIX SWEDISH SHIPS LOST.—One hundred and seventy-six Swedish ships, with a gross tonnage of 175,000, have been destroyed in the course of the war. For the most part they were sunk by German submarines. One hundred and twenty-one were steamships. Generally the Germans were reluctant to sacrifice costly torpedoes on small prey. The biggest ship loss was the *Fridland*, of 5000 tons. Through the destruction of these ships 224 Swedes were killed and drowned, in addition to other nationalities among the crews.—*N. Y. Herald*, 11/5.

UNITED STATES

SHIPS AUTHORIZED.—Six new authorized United States battleships are designed to be of 41,500 tons, the largest battleships in the world.—*Official Bulletin*, 30/4.

TWO 1000-FOOT DOCKS FOR NORFOLK.—The original plan of the Navy Department for the construction of new docks of the largest capacity called for two such docks at Philadelphia and one at Norfolk. This plan has been changed and one is to be built at Philadelphia and two at Norfolk. According to Rear Admiral McLean, commanding the Fifth Naval District, one of the docks now under construction will be ready next fall. Their length will be such that any ship which can pass through the Panama Canal, where the locks have a limiting length of 1000 feet, can enter either of the two docks which are to be built at Norfolk. This new work is of the most urgent character and it should be rushed to completion with all possible speed.—*Scientific American*, 27/4.

CONCRETE LIGHTERS.—S. W. Stewart, president of the Ambursen Construction Co., 61 Broadway, announced recently that the Navy Department had awarded a contract to his company for the construction of four reinforced concrete fuel oil and coal barges, designed to carry 800 tons, to be used in New York harbor. It is believed that the Navy Department will build 12 of these vessels. One of the chief difficulties in designing these vessels was to make the concrete oil proof. This was met successfully, the company says, and it believes that the method of construction devised will be found suitable for oil tankers in the Gulf and coastwise service.—*N. Y. Herald*, 25/4.

BALTIMORE TO BE BIG NAVAL SHIPPING PORT.—Baltimore is to be made a large base for the shipment of naval supplies, according to information gathered at the City Hall. Representatives of the Navy Department have been in conference with the Board of Estimates over the use of the city wharf at the foot of Hughes Street.

The plan as outlined is to build a warehouse and depot on a lot 20,000 feet square and to utilize other portions of the pier, said to be well adapted to the uses of the government as a shipping center. It was stated that an expert from Washington would be in Baltimore in a few days to make an inspection of the pier and let the city officials know exactly what is wanted.

The Board of Estimates is disposed to let the government have all the water-front space it might need to help win the war, and the Hughes Street wharf will be leased if the navy needs it.—*Baltimore Evening Sun*, 25/4.

DRY DOCK.—Charleston is happy over the decision of the Committee on Naval Affairs of the House of Representatives to have \$9,000,000 authorized for the construction of a huge dry dock at the Charleston Navy Yard and the dredging of a 40-foot channel from the yard to the sea. A first appropriation of \$1,500,000 for channel work has already been adopted by the House of Representatives as part of the Rivers and Harbors Bill, and the maximum authorization for this work is \$5,000,000.

The channel will be 1000 feet wide from the navy yard to the sea, which will take in a very large part of the Cooper River, and will be 40 feet at low water, thus making Charleston one of the few very deep ports of the world. The dock is to cost \$4,000,000 and will be capable of handling any vessel that can pass through the Panama Canal. The dock appropriation is in the new naval bill.—*N. Y. Herald*, 10/5.

AVIATION IN THE NAVY.—In the course of the discussion on the naval appropriation bill in the House of Representatives on April 19, much information was divulged as to the condition of aviation in the navy, the establishment of bases, progress in the manufacture of flying machines, and the merits of the Liberty Motor. In fact, after the discussion of the item of \$188,042,969 had gone on to the point of exhausting nearly all the secrets of our aviation program, Mr. Butler called the House to attention by asking the question: "Does not the chairman think that we have now told the Hun all we know about the motors and that we have not flying machines?" This query brought the discussion to an abrupt end.

Among the facts revealed in public for the first time were that the U. S. Navy had aviation bases in operation in Ireland and Scotland as well as in England and France. The largest airplanes we are constructing now cost \$42,000 each, \$30,000 for the machine and \$6000 each for the two engines. Mr. Padgett explained that much of the delay in the carrying out of our aviation program was due to the inability of the industry in America to live up to its promises although they were now making an improvement in respect to deliveries. He also quoted Chief Constructor David W. Taylor, U. S. N., as stating that the navy was up to its promises and expectations with training machines, but that they were about 60 days behind on the combat or fighting machines, and they were making good progress toward getting up to their expectations.

Mr. Husted said he had found that in the army they are turning out flying students at the ground schools much faster than they were able to provide them with planes in which to learn to fly, and his inquiry brought out the statement that the same condition existed in the navy. Mr. Padgett, however, quoted Colonel Deeds as stating that there is not an aviator abroad who has not machines with which to fly, and that there will not be one abroad that will not have machines when he needs them. These would be foreign machines, he explained, but he made the point that the men who would have the planes they needed now and that we had begun to ship machines abroad to provide for the future. Chief Constructor Taylor stated to Mr. Padgett that the manufacturers would be turning out the big 92-foot machines at the rate of two a day "as soon as they got their plans developed."

In response to a question, Mr. Oliver stated that all the navy airplane stations were now provided with training planes and that they are fairly well equipped with service planes for advanced training. At all our foreign stations we have a sufficient number of pilots, mechanics, and other trained officers to carry on the work at present. All these planes, however, had been obtained from France. He added that the navy was now prepared to ship at least 20 service planes abroad and that "shipments will steadily increase, so Captain Morrill has informed me." Mr. Oliver stated that "we had something like 320 officers and men in the aviation service when war was declared; we have now more than 17,000."

Mr. Britten declared that "aviation in the navy to-day is almost a complete failure," after stating that on April 1, 1917, the navy had 93 completed seaplanes with 133 under construction. On January 1 of this year the navy had 324 completed planes all told, many of which were obsolete, this being an increase of about 100 in nine months of war. "If that is making real progress," he declared, "I do not know the meaning of the word."

Mr. Farr pointed out, as a defence of the Liberty Motor, that Germany had maintained her strength in the air largely through one machine, the Mercedes; that she has made no changes in that machine but by tactical experience and ability has utilized it to great advantage.—*Army and Navy Journal*, 27/4.

FORD SHIPYARD FOR "EAGLE" CLASS BOATS.—Where was a swale there stands what is said to be by engineers the largest building in this country, which might as well include the entire world without fear of refutation. It is 300 feet wide and 1700 feet long, of steel and glass construction. In it will be housed at one time a score of the craft that are to be turned out in wholesale quantities for the government. And it is only one of a group, the rest of which are almost as imposing.

Where once Roulo creek twisted and turned and back-tracked across the fields, there are heavy concrete bases that will support transfer tracks leading to the launching slip.

When you ask what became of the creek, they point off across the field toward Maple road, and in the most matter-of-fact way tell you that they put it over there. Such a trifling matter as sending a creek that in many sections would be counted a river down through a specially constructed channel, with concrete retaining walls, and appropriating the course it had run for generations for other purposes, doesn't particularly interest the engineers in charge of this job, because to them it is a minor item.

The same fine disregard for natural obstacles is displayed all along the line. Whoever heard of putting a shipbuilding plant inland and bringing water to it? Yet that is exactly what is being done here.

The plant is commonly spoken of as being on the Rouge River.

The building where the boats are to be assembled is fully a half mile from the Rouge at its nearest point. The launching basin adjoins this building, so a channel wide and deep enough to accommodate a good-sized freighter is being excavated, or, perhaps, sloughed would be a better term to employ, because of the manner in which it is being done.

Usually on such a job a number of dredges would be put at work digging the channel, and the dirt taken out would be loaded on scows and towed away, or it would be piled up on the bank, a barrier to further progress in that direction. Not so here, where saving of time is the big consideration.

Outwardly the huge hulk that is eating its way through the fields with almost incredible rapidity resembles, to the layman, an ordinary dredge. However, it differs very materially, for instead of a big shovel coming up with its slimy load a giant agitator revolving at any desired depth in the water moves from one side to the other of the channel, working the soil loose and mixing it with the water. It is then drawn into a flexible pipe line, and by means of air is pumped for a quarter of a mile on to low ground, where the dirt can be used for filling, the water draining off naturally. Thus, with a single operation, two purposes are served, and the excavator eats its way into the bank with a speed that discounts the old system, having a capacity of 500 yards per hour.

The water in this channel will average 12 feet in depth, and there are portions of the course where as much more dirt must be sloughed off above the water-line, so that aside from the unique manner in which the task is being accomplished it is an undertaking of magnitude.

Originality crops out on every side, and everything is planned with a view to expediting the assembling of the boats which are so sorely needed

right now, and which, it is predicted, will be in commission before summer is at hand.

There will be no duplication of effort, no unnecessary handling of material, with the attendant expense and loss of time. The raw stock is to be taken into the fabricating plant of itself 150 feet wide and 450 feet long, on one side, cut and shaped and sent out on the other side to the assembling building. Here there will be three shipways, each capable of accommodating seven of the craft at one time, with a serving track between each of the shipways, from which material can be delivered to the workers as needed.

Each boat is to be mounted on special trucks running on tracks laid lengthwise of the building. Several groups of operations are required in assembling a boat, and as fast as one is completed the craft will be moved along to the next band of workmen, until eventually it emerges at the far end complete.

Instead of breaking a be-ribboned bottle of grape juice over the bow of the vessel as it slides off the ways, in conformity with time-honored tradition, it will be taken in hand by a hydraulic lift and deposited in the water, ready for the machinery and the finishing touches that will be given a little farther down the slip.

And by the time the boat is in position for the machinery the truck that carried it will be back at the end of the line ready to start the trip all over again.

It is an adaptation of the conveyor assembling system which has been developed so thoroughly in the putting together of cars at the Ford Motor Company's factory, and it is predicted that, making due allowance for the difference in size, the boats will be coming through with the same proportionate speed when this plant is in full running order.

As for the boats themselves—*Eagles* they will be officially christened—little can be said at this time, because publishing the details could easily be construed as treasonable on the ground that it was furnishing aid to the enemy; although by no stretch of the official imagination could such action be regarded as giving comfort to him. Indeed, the best naval constructors in this country, and some of the brightest minds abroad, who have had a hand in fashioning the craft, or who have been permitted to go over the plans and see the working model, are unanimous in asserting that once afloat these chasers will be anything but a comfort to the Kaiser and his cohorts.

Built for Business.—From stem to stern, from keelplate to the top of the radio staff, every bit of the craft will be steel, wood being entirely eliminated. The *Eagles* are not being built for display. They will be required to undergo the hardest sort of usage, and, while everything is complete, it is evident that business first was uppermost in the minds of the designers. The hull is divided by water-tight compartments that render it practically unsinkable.

The prow is knife-like, and it is reinforced in a manner that is most deceiving to the casual observer, for the boat will be able to deliver a terrific blow to an enemy craft without suffering any damage. It is intended for hit and run purposes, and its mechanical equipment is such that it can be handled almost as easily as one of the automobiles that have made their maker famous.

When it comes to mixing things with the enemy, the *Eagle* has little to fear. In the first place, it is of exceptionally light draft. Then the hull is of such a type that should a torpedo find it, the missile would probably glance off before it did any harm.

Here is an interesting thing in connection with these sub-chasers—every step is interesting, for that matter, but the procedure here was so unusual as to single it out for distinction.

The first *Eagle* was built miles from any body of water, which of itself upsets every precedent. The plans had hardly been received from the Navy

Department in Washington—and they were little more than a couple of drawings—when the best engineers and draftsmen in the Ford organization were put to work. None of them had ever helped build a ship, but that made no difference. Bit by bit they figured out a model on paper, and before the last drawings were complete the ribs of the hull were in place, and the plates were being put on the sides.

One of the big factory buildings served as “dry dock.” Here, far from its native element, the boat was assembled complete, even to the radio outfit. It was a new undertaking, but so carefully had it been planned that no material changes were found necessary.

With the first boat completed, the company was in possession of a set of perfect patterns from which others could be fashioned in any desired number. Talk about standardization! You could take a whole fleet of these boats, jumble the parts together, sort out what was needed, without any reference to “serial numbers,” and each unit would fit into place as though made especially for that particular craft. That is a long step in the direction of quantity production that seasoned shipbuilders seem to have ignored up to the present.

Then the Ford company proceeded to give another demonstration of how speed can be attained. It might have decided to install special machinery to handle the material that is to go into these chasers. With good luck, production could possibly have been begun within a year and one-half. But the boats are needed now—therefore, make them now. The very machinery that had been used in producing automobiles was turned over to the shipbuilding department. The production of motor cars was cut down one-third, in conformity with the government plan, and it will be reduced still farther if found advisable.

Presses and shapers and other machines needed in the work were shifted from the parent plant to the shipyard on the west side, and while this was being done parts were fabricated at the main factory and sent across town by rail so that no time would be lost.

These engines are being built at the plant of the Ford Motor Company, and will be laid down ready for installation in the hulls on the 1000-foot docks at the outfitting station.

To an outsider the transformation which has been wrought suggests that the day of miracles has not passed entirely. The men who are engaged in the work take an entirely different and more practical view of it.

“When you have one of the greatest organizations in the world back of you, with Mr. Ford for boss, and his money to spend to the limit, so long as you produce results, you can do almost anything,” said “Bill” Knudsen, as we hiked along a well-rolled cinder roadway where a few days before had been a sinkhole into which carloads of brickbats had been dumped before any bottom could be formed. “Of course, the plant has gone up in a hurry, and it looks now as though we would make our schedule, which was a stiff one. But everybody has pulled together fine. And why shouldn’t they? The fellows over in the trenches are working a heap harder than we do, no matter how we speed up.”

As for Henry Ford, the presiding genius who is putting millions into a plant that may or may not be available for other purposes after the war is over, he only smiles when the matter of such a tremendous investment is mentioned.

“If these boats will hasten the end of the frightful carnage abroad and bring peace that is lasting, there will be no occasion to worry about the money spent,” he remarked in discussing the project. “We are in this thing to a finish and we’ve all got to work and give until it hurts—and then work and give a lot more, because while we did not make it, it is your war and my war, and we must see it through to a successful conclusion.”—*Detroit Free Press*, 28/4.

POLICY

INTER-ALLIED NAVAL COUNCIL IN SESSION.—The Inter-Allied Naval Council met recently at the Ministry of Marine, with Georges Leygues, French Minister of Marine, presiding.

Vice Admiral Sims, Captain Twining and Commander Babcock represented the United States, Rear Admiral Hope and seven other officers were present for Great Britain; Vice Admiral Thon di Revel and four other officers for Italy, and Rear Admiral and Captain Hamane for Japan.—*N. Y. Herald*, 27/4.

LACK OF AMERICAN DRY DOCKS.—Lack of dry docks in America constitutes almost as serious a menace as the submarine itself, according to a report issued by the War Shipping Committee of the Philadelphia Chamber of Commerce, in which vigorous appeal is made for additional dry dock facilities at the port of Philadelphia. The committee recommends to the United States Shipping Board that at least four dry docks of 350 feet or more in length be located at this port and that nothing should be left undone to have the construction of these docks completed at the earliest possible date. The report draws attention to the fact that 35 per cent of the ship construction program is to be carried out in the yards of the Delaware River district. At the present time there is but one private dock here, which, under normal conditions, is greatly overcrowded. With the tremendous increase in shipping facilities, the American nation is confronted by a serious scarcity of dry-docking facilities, the report continues. It is pointed out that in Great Britain, which has been pre-eminently a shipping nation, the number of commercial docks exceeding 350 feet in length in 1915 was 171, according to Lloyd's Register. In America to-day there are but 27 dry docks. On the Great Lakes, where the demand for water-borne transportation has contributed to the developing of shipping to the extent of 2,300,000 tons, there were in 1915 20 docks of 350 feet or more in length. On the basis of this proportion the report states that the United States will require 182 docks for our future mercantile fleet.

The amount of attention which will be required by the wooden ships as well as by the fabricated steel ships impresses the members of the War Shipping Committee of the Chamber as being a most important consideration. Engine-driven wooden ships engaged in transatlantic service would necessarily be subject to great strain and stress and could only be maintained in water-tight condition by constant recourse to dry-dock overhauling. Emphasis is laid on the fact also that vessels torpedoed near the Atlantic coast might be saved if they could be worked back to our ports and repaired promptly. Scarcity of dry docks on the Atlantic seaboard at the present time would render abortive any attempt to repair vessels in this condition, the report declares. From the shipping side of the question the report brings forward another point of view which is that the port of New York is overcrowded, and as it does not compare with Philadelphia as a point of origin for foreign shipments, there is only one reason why preference can be given it. That reason is that New York has nine dry docks of more than 350 feet in length. This compels vessels requiring dry dock attention to call at the port of New York. Recently a vessel for which a cargo was awaiting in Philadelphia was compelled to leave that port and go to New York for certain necessary repairs; naturally it never came back, taking a cargo on at New York.

In the report, the opinion of the Department of Wharves, Docks and Ferries of the city is cited to the effect that unless dry docks are built at Philadelphia promptly the advantages of this port with its fresh water, nearness to industries, distance from the sea sufficient to make it immune from attack and at the same time sufficiently near to be easy of access, will all be wasted. The report of the committee has been transmitted to the United States Shipping Board, to Rear Admiral Bowles, to Mayor Smith, and to other officials interested in the development of the port of Philadelphia.—*Shipping*, 27/4.

MATERIAL

\$200,000,000 ADDED TO BIG NAVAL BILL.—Additional appropriations of about \$200,000,000 have been added by the Senate Naval Affairs Subcommittee to the naval appropriation bill, which carried appropriations of \$1,358,000,000, as it passed the House. Of the increases, about \$120,000,000 are for naval ordnance.

The sub-committee recommended an increase of the \$24,194,000 appropriation for ordnance and ordnance stores by \$6,328,000; addition of \$45,537,000 to the House appropriation of \$48,309,000 for new batteries for ships; increase of \$34,530,000 to the \$39,259,000 for ammunition for vessels; increase for torpedoes and appliances from \$1,000,000 to \$11,000,000 and an addition of \$13,000,000 to the \$5,000,000 for reserve ordnance supplies.

The sub-committee also inserted new amendments providing \$3,000,000 for a navy mine depot and \$9,150,000 for a navy nitrate plant.—*N. Y. Herald*, 10/5.

FUEL OIL SHORTAGE SHOWN.—Opening of oil lands set aside as naval reserves, in order that the increasing shortage of fuel oil on the Pacific coast may be relieved, has been urged upon Secretary Daniels by representatives of oil companies and others. No decision has been reached, Secretary Daniels said.

The attitude of the department has not been changed since Mr. Daniels expressed his approval of the operation of naval oil reserves under federal supervision and the utilization of some part of the production for the relief of the situation on the Pacific coast.

The representatives of the oil interests told the Secretary they were perfectly willing to place their interests in the naval reserve lands in the hands of the President for settlement.—*Evening Star*, 7/5.

NAVY EMERGENCY RATION.—The newly adopted emergency ration for the navy will consist of 8 ounces of bread component (cooked wheat ground to a powder), 5 ounces of meat component (fresh lean beef reduced to a powder), and 1 ounce of common salt, all thoroughly mixed and compressed into tablets, four to a package. The chocolate component will be formed into cakes of 1½ ounces each. Three packages of tablets and three cakes of chocolate will be inclosed in a round tin bearing the following directions: "Calculated to subsist one man one day. Bread and meat component to be eaten dry or stirred into cold water; or one package may be boiled five minutes or longer in three pints of water and resulting soup seasoned to taste; or one package may be boiled in one pint of water for five minutes, making a thick porridge to be eaten hot or cold; when cold may be sliced and fried if bacon or other fat is available. Chocolate component may be eaten dry or made into liquid by placing the chocolate in a cup held in hot water. After melting add boiling water slowly, stirring constantly, until desired consistency is obtained." This ration is criticised by some of the food experts as containing too much salt and as otherwise calculated to produce undue thirst. The meat component is not regarded as essential by some of the authorities, who prefer only whole wheat bread with, if desired, bacon or sardines. In fact, the ideal emergency ration for naval use is said to be canned beans, sardines, and brown bread, as palatable and nutritious and as containing the necessary percentage of water. The difficulty of such a ration, however, is in keeping it intact for use in an emergency, as it is apt to be surreptitiously drawn upon as an attractive edible which the adopted ration is not under ordinary circumstances. This is on the theory that the navy is not likely to need to subsist on an emergency ration for very long at a time, and men who survive a disaster at sea could live for several days before being rescued, without any food at all, provided they had sufficient drinking water.—*Army and Navy Register*, 11/5.

DUTCH EMBARGO HURTS.—*America Must Seek Other Sources of Tin, Quinine and Other Things.*—Holland has placed an embargo on the exportation from the Dutch East Indies of tin, tin ore, cinchona bark, quinine, quinine salts and kapok, all of which are needed in large quantities by the United States for war purposes.

Official notification of the embargo, effective April 22, was received April 26 and caused much perturbation. Officials declined to indicate the probable reasons, but in some quarters it was suggested the measure was in retaliation for the American requisitioning of Dutch ships. Elsewhere it was thought to have been prompted by the critical situation in which Holland finds herself with Germany.

The embargo on tin and tin ore will prove especially embarrassing to the United States. Supplies needed for munitions and food preservation were expected to come from the Dutch East Indies, as the British are taking the entire output of the Straits Settlements. About 16,000 tons of tin was bought by the United States last year from the Dutch East Indies, and the amount probably would have been increased this year.

Cinchona bark, quinine and quinine salts are needed for medicinal purposes by the army. Kapok is a vegetable product, used in making hammock mattresses for the navy.

The United States is almost completely dependent for tin on the outside world. It is probable that Bolivia now will be looked to for a supply.—*Baltimore Sun*, 27/4.

PERSONNEL

NAVAL BILL CHANGES.—Some important changes are to be recommended by the Senate Naval Committee in the naval appropriation bill, which has been under consideration by the committee for some days, during which time representatives of the Navy Department were heard in explanation of the needs of the naval service. As the bill passed the House, the bill authorized increase in the enlisted strength to 228,000 men, all of which above the present authorized permanent strength of 93,000 was to be temporary for the period of the war. The Senate Committee has decided to recommend an increase of the permanent strength to 131,645 men, with an additional allowance of temporary strength to bring the total of both classes to 228,000, as carried by the House bill. The permanent allowance approved by the Senate Committee is the minimum number required to man the vessels of the navy of a permanent character now in commission and that will be placed in service up to July 1, 1919, and it does not provide for recruits under training, aviation personnel, etc., which will have to be carried in the temporary allowance. Notwithstanding the showing of the departmental officials of the need for increasing the permanent allowance of enlisted men, in order to provide personnel for new ships as they are ready for service, Secretary Daniels indicated his opposition to such increase, and would only approve increase of temporary character. This is one of the reasons that only temporary increase was authorized by the House bill. Certain members of the Senate Committee appreciated the need for an increase of the permanent allowance, and when this was brought to the attention of Mr. Daniels he consented to approve only so much as is absolutely needed for new ships that are expected to be ready for service between now and July 1, 1919, and he would not approve any additional permanent allowance for recruits under training, the air service, etc.—*Army and Navy Register*, 11/5.

READJUSTMENT OF NAVAL PERSONNEL.—Data is being prepared in the Navy Department showing reasons why the law should be amended by removing the limitation against the temporary promotion of officers, on the basis of the temporary personnel, beyond the grade of lieutenant commander. This data will be submitted to the Senate Naval Committee in an effort to have the pending naval appropriation bill amended to provide

temporary officers in the higher grades on the same ratio as allowed for the permanent commissioned personnel. The act of August 29, 1916, provides that the total number of commissioned officers of the active list of the line of the navy, exclusive of commissioned warrant officers, shall be 4 per cent of the total authorized enlisted strength of the active list, exclusive of the hospital corps, prisoners undergoing sentence of discharge, enlisted men detailed for duty with the naval militia, and the flying corps. The act also provides that the commissioned line officers of the active list shall be distributed in proportion to one of the grade of rear admiral to four in the grade of captain, to seven in the grade of commander, to fourteen in the grade of lieutenant commander, to thirty-two and one-half in the grade of lieutenant, to forty-one and one-half in the grades of lieutenant (junior grade) and ensign. It is desired to have the commissioned personnel of the line based on the temporary authorized enlisted strength distributed in the same proportion, instead of being limited to the grades of lieutenant commander and below as at present. It will be shown to the committee that already there is need of a greater number of flag officers for duty afloat than are available with the present number of officers in that grade, and the need will increase as the war goes on. In fact, at present about 50 per cent more flag officers, captains and commanders are needed than are in those grades.—*Army and Navy Register*, 4/5.

RANK AND PRECEDENCE IN NAVY.—The Secretary of the Navy proposes the enactment of a law providing that officers of the line and staff of the navy, who have been or may hereafter be permanently appointed in the same grades and ranks in accordance with the act of May 22, 1917, shall take rank and precedence over temporary appointees. In submitting this matter to Congress, Mr. Daniels says:

"As the law now stands with relation to rank and precedence of officers, those appointed for temporary service under the act of May 22, 1917, take rank with permanent officers of the navy of the same rank and grade according to the dates of their commissions, an officer of an earlier date of commission taking precedence over an officer of a later date in the same rank or grade. As a consequence, officers newly appointed in the lowest grade, who have had little or no training to fit them for the duties of their office, take rank and precedence over graduates of the Naval Academy who may be permanently appointed only a few days later after the completion of a course of three or four years of intensive training. The benefits of the proposed legislation will extend further. Some officers of the permanent navy who have been temporarily advanced under the act of May 22, 1917, to the grades of rear admiral, captain and commander will be selected to fill permanent places in these grades. Although they may be selected by the board for permanent promotion over other officers who hold temporary appointments in the same grade, yet under existing laws they will not gain seniority over such officers until the termination of all temporary appointments under the act of May 22, 1917, at which time permanent officers holding temporary commissions in higher grades will revert to the places from which they were advanced, or to the places to which they are entitled to be promoted under the act of August 29, 1916. I believe it is not to the best interest of the service that temporary officers should take rank and precedence ahead of permanent officers of the same rank and grade by reason of earlier date of commission alone. Favorable consideration of the inclosed draft of a bill is, therefore, recommended, with the request that it be enacted as a separate bill or be inserted as a provision of some pending legislation relating to the personnel of the navy."—*Army and Navy Register*, 4/5.

MIDSHIPMEN.—While the result has not been definitely announced, it is believed that the class entering the Naval Academy in June will number

not less than 1000. The largest class heretofore was 750. Authority has been included in the naval appropriation bill for the construction of a new auditorium at Annapolis. Hereafter, candidates for the Naval Academy must be between the ages of 16 and 20 years on April 1 of the year admitted, as noted on our Congress page.—*Army and Navy Journal*, 11/5.

WILL ENLARGE MARINE CORPS.—*House Votes to Make Strength 75,500.*—Increase of the Marine Corps' strength to 75,500 was voted by the House to-day to enable the navy to put an entire division of the sea soldiers at the front with Pershing's Expeditionary Forces. Provisions for the increase, which would add about 50 per cent to the enlisted personnel, was approved by the Naval Committee, and promptly was made a part of the naval appropriation bill under consideration in the House.

The action was based on a recommendation from General Pershing that the brigade of marines now attached to his forces be raised to a complete division. With 75,000 men the Navy Department not only could maintain a division of 27,000 men in France, but would be able to organize certain advance base forces that have been planned for some time.

It was learned to-day that in conformity with his promise that the marines would be moved up to the front at the earliest possible opportunity, General Pershing recently has relieved them of the guard and transportation duties upon which they have been engaged since they landed in France.

A proposal by Representative Padgett, chairman of the Naval Committee, to create three additional major generals in the Marine Corps was withdrawn temporarily during to-day's debate in the House. With an appropriation of \$25,000,000 to take care of the additional number of marines, the bill carries a total of \$1,352,608,673. House leaders predicted its passage to-morrow.—*Baltimore Sun*, 20/4.

SELECTION PROMOTION FOR MARINES.—Marine Corps consideration has been given at the headquarters of the corps to the method of making the advancements, of which there will be many as a result of pending legislation. It has been decided that selections for promotion to the grades of colonel, lieutenant colonel and major shall be made by a board of about seven officers from among the brigadier generals and senior colonels of the corps. Owing to the fact that the grades of first and second lieutenants are filled now by those that have been serving a comparatively short time as commissioned officers, and not enough opportunity has been had to determine comparative fitness, promotions to the grades of captain and first lieutenant will continue by seniority in the regular corps. Unless the naval appropriation bill as reported to the House is changed in that respect, practically all of the promotions will be of temporary character, the only exceptions being in the case of those on account of casualties in the permanent personnel and in the case of those resulting from the appointment of one colonel as permanent brigadier general to fill the vacancy caused by advancement of a brigadier general to fill the single place in the grade of major general proposed by the bill. Of course, however, in view of the prospects that there will be an increase allowed much greater than the 20,000 originally proposed, it is likely that a greater number of general officers and the colonels and lieutenant colonels than now carried by the bill will be authorized, the bill as reported to the House carrying, in addition to the permanent major general, three brigadier generals, twelve colonels and twelve lieutenant colonels as an additional temporary allowance.—*Army and Navy Register*, 20/4.

RESERVE AND MILITIA

AMENDMENT OF NAVAL RESERVE LAWS.—Important changes in the naval reserve organization are contained in the naval appropriation bill now

before Congress. The old naval militia and the national naval volunteers will cease to exist, and the members of the latter organization are automatically transferred into Class 2 of the Naval Reserve force, known as the "Naval Reserve," for general service, and confirmed in the rank, grade and rating they now hold in the national naval volunteers, without examination. The Fleet Naval Reserve and the Naval Reserve will become practically identical, both classes being composed exclusively of officers and men who are fully qualified for service in their rank or rating on board of combatant ships. The medical and dental reserve corps will cease to exist, and members of those organizations will be enrolled in the Naval Reserve force in their present grades and ranks.—*Army and Navy Register*, 27/4.

U. S. MERCHANT MARINE

WHAT THE SHIPPING BOARD HAS DONE.¹—By Edward N. Hurley, Chairman of the Shipping Board.—If by the exercise of magic a bridge could be thrown across the Atlantic over which our armies, their artillery and supply trains could move rapidly and unhampered to the battle lines in France, would any military man in Berlin, Vienna, Rome, Paris, London or Washington have any doubt but that the world would be made safe for democracy before the year goes out? We have the men, we have the guns, we have the supplies. But without means of getting them to the front we might as well be without them. And unless we get our men to the battle line we will not win this war.

So it all comes back to ocean transportation—to the vital need of ships. Fail there and we fail utterly. Upon the Shipping Board has devolved the responsibility of supplying this need, and supplying it under the most extraordinary conditions that ever existed—supplying it at the most crucial period of the war's history, at a time when every other industry is being taxed to its utmost capacity in the matter of materials and labor to provide war necessities.

The handicaps have been many. We were not a maritime nation. Our flag had almost vanished from the seas, and with the exception of a few widely scattered shipyards, merchant marine construction had almost become a lost art with us. Then came this sudden call to outdo the rest of the world in the upbuilding of a merchant marine; a call coming at a moment when the navy was undergoing the greatest expansion in its history—when most, if not all, of the established yards were feverishly engaged in rush construction on dreadnaughts, destroyers, submarines, fuel ships, tenders and other auxiliary craft, and when munition makers were absorbing that part of skilled labor which had not been called to government navy yards or private shipbuilding plants. So it was a case of not only working from the ground up, but of first securing the ground upon which to make a start, some of it, marsh land, which had to be filled in before launching ways could be laid.

When we took hold of this job of shipbuilding we found there was no shipyard in existence with which we could place an order. The old yards, with their trained force of shipbuilders, were filled to capacity. Seventy per cent of their space was taken by the enlarged naval program. The remainder of the space was taken by the orders which had been placed by American owners, and by foreign owners, who, pressed for more ships, had filled the yards of America to overflowing.

We were faced with the necessity of creating an entirely new industry. We had to establish the yards first, get the shipbuilders to take charge of them, and train the men to build the ships. There were 37 steel shipyards in America at the time of our entrance into war. We have located 81 addi-

¹From an address before the National Marine League, New York, March 26.

tional steel and wood yards, while 18 other yards have been expanded. We are building in the new and expanded steel yards 235 new steel shipways, or 26 more than at present exist in all of the steel shipyards of England. The new industry we have created will make America the greatest maritime nation in the history of the world.

Struggling against something that cannot be avoided is more baffling than struggling against something that can be. You can appeal to striking men to go back to work, but you can make no appeal against zero weather. We did what we could. We told the new shipyards to go ahead and use dynamite in locating their pilings. The men in those yards fought the bitter winter. They had the same spirit, and demonstrated the same pluck and unselfishness as the men in the trenches. And they have virtually completed the job of building America's new shipyards—the new yards that will make us the greatest shipbuilding nation.

It has been an uphill struggle, but we have had our moments of elation when we have felt that we are making progress. The record made by the Skinner and Eddy Company of Seattle is a case in point. That company laid the keel for an 8800-ton vessel, which was launched in 64 days. She was delivered to the Fleet Corporation on January 5 and started on the first voyage on January 14. This record accomplishment shows what can be done in live, wide-awake efficient American shipyards.

Then a few days ago we received a telegram from the Moore Shipbuilding Company of Oakland, Cal., announcing the successful launching of one of their large vessels. Twenty minutes later we received another telegram from the same company announcing the launching of a second ship of the same type, and 40 minutes afterward a third telegram saying that a third vessel of similar character had gone overboard. This was the record of one American shipyard. The launching of three 9400-ton vessels in a single afternoon—an accomplishment which I believe is unrivaled in the world's annals of shipbuilding.

The total amount of our steel construction on March 1 was 8,205,708 dead-weight tons. This is made up of 5,160,300 dead-weight tons under contract with the Emergency Fleet Corporation, and 3,045,408 dead-weight tons of requisition vessels.

Of this total steel construction, 2,121,568 dead-weight tons, or approximately 28 per cent, has been completed. That means that in addition to the building of our big new yards we have also been building ships. That is, the program for steel ships has advanced 28 per cent toward completion. Of the amount of steel ships under contract and under requisition, 655,456 dead-weight tons, or approximately 8 per cent, were actually completed and in service on March 1 of this year, nearly a month ago. This amount of floating tonnage exceeds our total output in 1916, including steel, wooden and sailing vessels, by approximately 50 per cent.

Notwithstanding the difficulties of organization, the handicaps of bad weather conditions, transportation embargoes and railroad congestion, nearly as much tonnage has been constructed in American waters in the past three months as by all the other maritime nations of the world combined.

We have had to build up a tremendous administrative organization, with expert naval architects, expert traffic and operating heads, and at a time when the demand for such talent greatly exceeded the supply. We have had to negotiate for neutral tonnage. We have had to requisition and provide for the operation of the entire existing American merchant marine; we have had also to provide skilled supervision for the repairs of interned German ships which were seized.

The Germans thought that by crippling their own vessels in American waters they would be able to prevent us from using them. American ingenuity and resourcefulness gave the answer by restoring these vessels to efficiency. With the expenditure of a little less than \$8,000,000 (£1,650,000) we have succeeded in placing in our war service and in the service of the

Allies 112 first-class German and Austrian vessels representing a carrying capacity of nearly 800,000 dead-weight tons.

At the outset the 37 old steel yards began increasing their capacity until they now have 195 ways as against 162 eight months ago. Other parts of their plants have increased proportionately. We then made provision for additional new steel yards, some of which have been given financial assistance by the Emergency Fleet Corporation. Thirty additional new steel shipyards are thus being erected, with a total of 203 shipbuilding ways. Thus we now have in the aggregate 67 steel shipyards either wholly or partly engaged in Fleet Corporation work. These yards will have a total of 398 steel building ways. Of these, 35 yards with 258 ways, are on the Atlantic and Gulf coast; 19 yards with 6 ways are on the Pacific, while 13 yards with 74 ways are on the Great Lakes.

Our program for building wooden ships has been beset with many difficulties and handicaps which could not well be foreseen. A year ago, wooden shipbuilding in the United States was almost a lost art. We found 24 old wooden shipyards, with 73 ship ways. The capacity for wooden shipbuilding has been increased until we now have 81 wooden shipbuilding yards, with 332 ways completed or nearing completion.

Assuming that these ways will each produce two standard ships per year, we should turn out about 2,300,000 dead-weight tons of wooden ships annually. These 332 wooden shipbuilding ways, now nearing completion, added to our 398 steel building ways, will give us a total of 730 berths upon which to build steel and wooden vessels. When you consider that we had only 162 steel building ways a few months ago and 73 wooden shipbuilding ways—a total of 235—an increase is shown of 495 wooden and steel berths on which we can build ships.

With our total of 730 wood and steel ways, we will have 521 more berths than Sir Eric Geddes in his recent speech stated England has at the present time.

From the transportation standpoint, we must expect absolute freedom in the movement of our materials; otherwise the speeding up of manufacture is wasted, and consequent delays in finished ships will result. We look to the Railroad Administration with full confidence that they will supply our needs in this respect.

The situation giving us the most concern is the completion of turbines and engines. The very rapid expansion of the shipbuilding program caught the turbine and engine manufacturers totally unprepared. Special tools of all kinds were required for the engine builders' shops, and these tools had to be secured from manufacturing shops already overcrowded with war orders. In addition to this, the severe weather and the transportation tie-up seriously delayed the construction of some of our largest turbine building plants. We anticipated delay during the earlier months for lack of the turbines and engines, but expect to make up for the early shortage.

The proposal to build ships of concrete was first regarded as a fascinating absurdity. On March 14 there was launched from the yards of the San Francisco Company the first concrete steamship, a vessel which the builders christened *Faith*. We hope she will exemplify her name.

Now as to labor—our strong right arm! There has been much talk of conscripting labor, of forcing it into shipyards as our soldiers have been brought into the camps. I wish to put myself on record as being opposed to the conscription of labor. I do not believe conscription necessary, for I believe labor itself will produce conditions which will render idle all thought of conscripting workmen. The vast majority of our workmen are men of intelligence, and when they come to a full realization of the fact that any defection on their part now will not only imperil the nation, but will injure their fellow-workers in almost every field of industrial activity, I feel sure they will respond to all demands made upon them. Unless they fully do their part, their brothers will suffer.

It would be useless to manufacture material and supplies and pile up the products on the wharves if there are no ships to transport them. So, unless our ship workers do their best, other industries must slow down or halt completely, with the result that thousands of workers throughout the country will suffer for lack of employment.

I believe that labor has begun to realize that fact, but I want to drive it home to them; for there are some, I regret to say, who do not yet sense their responsibility. There are many who are not working to their full capacity. There are many who, because of the high wages they are earning, are prone to take too many holidays. Labor generally throughout our shipyards is to-day receiving the highest rate of wages ever paid for similar work in the history of the world. The additional cost of our ships, due to increased wages in shipyards covering the program we have mapped out, will be in excess of \$300,000,000 (£61,500,000). We expect, and we have a right to expect the country has a right to expect, that labor will render for this increase of wages a corresponding increase in production—that is the output of ships.

There have been inefficient shipyard owners, as well as inefficient workmen. Where there is an inefficient owner, who does not understand the viewpoint of labor and who thinks only of his profits, labor has a right to complain. We intend to know what the costs and the profits are in every yard. We feel that the public is entitled to this information.

We have felt that it was our duty to see to it that the problem of housing the workmen in these vast new plants we have been creating was solved with care. The cost-plus system has been banned by Congress in the housing operations, because Congress itself, as well as the rest of us, have felt that there should be a greater check, not merely upon profits, but upon the actual cost of all work done for the government.

The new yards have been established, wherever possible, away from the congested districts, and while this was necessary, it brought with it the problem of transportation as well as of housing. We are arranging now for proper transportation, as well as for proper housing.

Training of new workmen for the yards has, in itself, proved a difficult task, but we are accomplishing it. We have established a large training school at Newport News to which 247 skilled mechanics, selected from 22 yards, have been detailed for a six weeks' course of intensive training to fit them as instructors for recruits brought into the various shipyards. Our latest report shows that 115 of these have completed the course and have been sent out as instructors. These men represent 16 trades. The men who are taking this instruction course will be capable of training an industrial army of 37,000 men. A department of training electric welders has also been established.

We have recruited a volunteer force of 250,000 highly skilled mechanics who have, with a patriotism that has made us all proud, agreed to hold themselves in readiness for our call. These men are being held in reserve in their present employment until such time as in the development of our yards the demand arises for their services.

In referring to what have been popularly termed our three fabricating shipyards, these assembling yards, with their 50 ways at Hog Island, 28 at Newark Bay, and 12 at Bristol, will, when they are in full operation, produce in a single year more ships than England, the greatest maritime nation of the world, has even been able to turn out in the same length of time. Already at the yards of the Submarine Boat Company at Newark Bay, 15 keels have been laid, and 13 more will be put down as soon as the remaining ways, now in course of construction, are completed. By the time the last way is finished the vessel on the first way will be well on towards completion; and as soon as it is slipped into the water another keel will be laid in its place, and we will thus have a continuous series of vessels dropping into the water from this yard at the rate of two a week. Even greater tonnage will be produced at Hog Island, with its larger number of ways and the bigger type of vessels which are being constructed there.

When the high point in the curve of production finally is reached, and the magnitude of America's shipbuilding program is realized it will be a continuous performance of production and launching. There is no doubt but that we are destined to be one of the leading shipbuilding nations in the world.

We will have the largest number of shipyards, the materials and the labor, and when our shipbuilding plants are completed and are well organized on sound business lines so as to produce ships cheaply and rapidly, we will not only produce sufficient ships to become the leader in the commerce of the world by furnishing transportation at reasonable rates, thereby performing a service to the rest of the world, but we will build ships in such large numbers and at such fair prices that we will become the mecca of the shipbuilding trade of the world.

I have outlined the entire situation—in utmost frankness—concealing nothing, for we have nothing to conceal. Shipping is the essence of the struggle in which the world is now engaged—the central beam in the whole war structure. If that fails, all else fails. We are engaged in a race with the submarine. We, of the Shipping Board, are alive to the needs of the situation. The whole government in Washington is alive to it, and there is complete co-operation to bring success in this greatest task to which America has set herself.—*International Marine Engineering*, May.

Schwab Gives Recipe for Building Ships.—Charles M. Schwab to-day revealed how he purposes to put through the greatest shipping program the world has ever known in two words: "Rivalry; Enthusiasm." He had just returned from a trip through the plant of the Sun Shipbuilding Company at Chester.

"I am getting all my information as to existing conditions in the shipyards at first hand," he said, as he came from a conference in Rear Admiral Bowles's office. "I am seeing this job with my own eyes and drawing my own conclusions.

"The preliminary work in the shipyards of the Philadelphia district has been very well done. The launching of the 6000-ton *Tuckahoe* at the yard of the New York Shipbuilding Company, in Camden, within 27 days from the time work was started showed what we can accomplish in the construction of steel ships along the Delaware. It is a forecast of bigger things to come."

"But can you keep up that gait? Won't your executives and your workmen tire?" he was asked.

"Not when they get two essentials to sustained quantity production," he replied. "These essentials are enthusiasm and rivalry. Virtually the whole secret of my success in handling big things may be summed up in these two words.

"You can't get men to endure extraordinary labor unless you arouse enthusiasm. You can't get them to go a stiff pace unless the man who tries to arouse them to such effort is himself a setter of the pace. The stern necessities of the times are such that production must pour out ships, munitions, and other warlike implements at a rate never before known. To achieve in such measure every American concerned in production must have a vision of free America outstripping autocracy in war as well as in peace. It is part of my job to extend that vision.

"Rivalry in the various shipyards goes hand in hand with enthusiasm. We have prizes and the less tangible, but quite as potential, incentives of proclaimed championships for rivaling gangs, pldring squads and other groups. Graphic charts are made which show at a glance how each yard is producing. The effect of this is to produce team work first in the groups comprising the working force in each yard and finally in the yard itself. The Pacific Coast just now is making the best record, but I am looking forward to a spurt along the Delaware River that will carry this district to the front."—*Evening Star*, 6/5.

SHIPPING BOARD ASKS FOR GRANT OF \$2,223,835,000.—Estimates submitted to Congress to-day by the Shipping Board call for an appropriation of \$2,223,835,000. For the cost of construction of ships authorized by the urgent deficiency bill of 1917, the board has requested an appropriation of \$1,386,100,000 and for the purchasing and requisitioning of plants and material, \$652,000,000.

Other estimates include: For acquisition or establishment of plants for shipbuilding, \$5,000,000; for acquisition of lands and buildings, \$50,000,000; for the operation of all ships proposed in the estimates, \$500,000,000; for acquisition of plants for construction of concrete ships and for construction of concrete ships, \$35,000,000; for recruiting and instructing officers for American vessels, \$10,250,000; for the cost of development of port facilities, \$25,000,000; for construction or completion of ships in shipyards and foreign countries, \$55,000,000.—*N. Y. Herald*, 8/5.

SHIPPING BOARD'S GOAL 13,500,000 TONS A YEAR.—Working at full capacity the 157 shipyards now established in the United States will be able to turn out approximately 13,500,000 tons of shipping each year if three ships are launched annually from each of the ways. Most of the recent launchings have been accomplished in a much shorter time than that, from the laying of the keel.

The United States Shipping Board and the Emergency Fleet Corporation are putting forth every effort to obtain the highest efficiency so that, with the completion of the big government-owned fabricating yards, the nation will be in a position to supply enough shipping for all of the men who can be trained this year and next.

There are at present 398 ways for steel ships. It is proposed that contracts for steel ships will call for an average of about 8000 tons each, and this program under the "three ships from each way" estimate would provide 9,552,000 tons.

The ways for wooden ships number 332, and these, on the same time basis, with wooden ships averaging 4000 tons, would provide an additional 3,984,000 tons, giving a total of 13,536,000 tons without taking into consideration construction work which may be done on concrete ships.

Here is what has been accomplished since the Emergency Fleet Corporation took over the shipbuilding industry:

Steel contract ships launched, 18; tonnage 136,250.

Steel requisitioned ships launched, 183; tonnage, 1,195,887.

Wooden ships launched, 35; tonnage, 108,500.

Total of steel and wooden ships launched, 236; tonnage, 1,440,627.

Steel contract ships delivered, 4; tonnage, 35,200.

Steel requisitioned ships delivered, 134; tonnage, 942,171.

Total of steel ships deliveries, 138; tonnage, 977,371.—*N. Y. Times*, 4/5.

TO GET 66 SHIPS FROM JAPAN.—*Ambassador Morris Concludes the Negotiations*.—Negotiations which have been in progress for some time between Roland S. Morris, the American Ambassador to Japan, and the Japanese Government and shipbuilders have been concluded. Sixty-six steamers, aggregating 514,000 tons dead-weight, will be turned over to the United States for use in the war. Deliveries of the vessels will begin in April of this year, and will continue until June, 1919. The ships have been placed in three categories, as follows:

First.—Twenty-four ships, 150,000 tons, will be chartered through the government to the United States Shipping Board for a period of six months. Deliveries will be made in April and May. The difference between the interallied charter rates and the rates paid by America—about 18,000,000 yen—will be paid by the Japanese Government.

Second.—Fifteen ships, aggregating 130,000 tons, new or partly built, for which the United States will release one ton of steel for one ton of shipping. The United States will buy the ships at a price which will vary according to delivery, which has been fixed at May to December.

Third.—Twenty-seven ships, of 234,000 tons, to be built in Japan between January and June of next year. The United States is to buy the ships, paying \$175 a ton, and releasing one ton for two tons of shipping. The new vessels will average 8,000 tons apiece.—*Baltimore Sun*, 22/4.

TWO HUNDRED WOODEN SHIPS ADDED TO PROGRAM.—Two hundred wooden ships are to be constructed as an addition to the shipbuilding program of the Shipping Board. They are to vary from 4500 to 4700 tons, dead-weight. They will be of the *Dougherty* or *Ballin* type.

The vessels will be constructed in shipyards already established and will be allotted, the Shipping Board announces, among yards most efficiently managed. Construction will begin as soon as vessels building are off the stocks.

This will increase to 580 the number of wooden ships completed, building and planned.

The board also decided to authorize construction of 25 new seagoing tugs, increasing to 100 the number of such draft now building for the board.

The tugs will be employed in coast traffic, replacing those diverted overseas.—*Evening Star*, 3/5.

THE TONNAGE OUTLOOK.—The production of American shipyards in April has been estimated at 240,000 tons by the Commissioner of Navigation. This is almost 50 per cent more than in March, when 166,700 tons were completed. April ship deliveries reached 32, as against 9 in January, when the yards were hampered by unfavorable weather conditions. From now on our shipbuilding output should show a rising total from month to month. The progress thus far made justifies the belief that the production for 1918 may reach the goal set of 4,000,000 tons. It is doubtful, however, whether British yards can materially improve on their output for last year, when 1,161,000 tons were completed. Aside from the lack of man-power, Great Britain's imports of steel and iron ore from foreign countries has been very much cut down since the inauguration of Germany's ruthless submarine campaign. In a recent debate on the naval estimates before the Main Committee of the Reichstag, Admiral von Capelle spoke of the steel question as being the determining factor in shipbuilding. One of the most important economic results of Germany's U-boat warfare was the reduction of Great Britain's steel imports in 1917 by three-eighths, as compared with the year previous. To be exact, these steel imports fell from 763,000 tons to 497,000 tons. It is true that Sir Eric Geddes has denied that there was a lack of material, but British expert circles concede that the main reason for Great Britain's small shipbuilding output has been the scarcity of steel. Until this can be overcome by increasing the number of ships afloat so that Britain's steel imports can reach their former volume, no marked improvement in the amount of tonnage completed in shipyards of the United Kingdom would seem to be possible.—*Nautical Gazette*, 11/5.

FIFTEEN STEEL SHIPS, 92,000 TONS, IN WEEK'S DELIVERY.—Following the launching of the "wonder ship," the steamship *Tuckahoe*, built in 27 days at the Camden yards of the New York Shipbuilding Company, the Shipping Board announced to-day a record week of deliveries of steel vessels. In the week ended May 4 unofficial reports received by the Board show that 92,000 tons were delivered. If this average is maintained the output of steel steamships for the year will be 4,780,000 tons. As it is expected the weekly average will be increased, the year's output, it is estimated, should be five and perhaps six or seven million tons.—*N. Y. Herald*, 7/5.

THREE HUNDRED AND THIRTY-TWO-FOOT SHIP OFF WAYS; BUILT IN 27 DAYS.—Establishing the best of all war records in the building of ships, the New York Shipbuilding Company recently launched the single screw collier *Tuckahoe* 27 days after her keel was laid. Ten days from now the com-

pany promises to turn the new vessel over to the government fully completed for service.

The launching took place in the presence of the officials of the ship-building company, Edward Hurley, Chairman of the Shipping Board; Charles M. Schwab, and Senator David Baird, of New Jersey. Miss Helen Hurley, daughter of Mr. Hurley, christened the vessel.

The vessel is built after the English rather than the American type, and is 332 feet and 6 inches long. Her beam is 49 feet 6 inches and depth 29 feet 6 inches. She weighs 5548 dead-weight tons. The steady arrival of material and the loyalty and energy of the men are given as the reason for the remarkable record in building.

The *Tuckahoe* entered the water with boilers, stacks, masts and gun mounts, all of which were installed on the vessel during the building.—*N. Y. Herald*, 5/5.

COMPENSATION FOR DUTCH SHIPS.—It is stated that America has 69 Dutch ships, of which only 30—all over 2500 tons—are to be used in Atlantic trade. The owners will be paid on gross or deadweight tonnage a sum nearly three times the amount the British Government pays for its ships. Insurance will be included, and the only deductions are for the cost of repairs making ready for the first voyage. Owners are to be paid in cash for all losses, or have their ships replaced as soon as possible after the war.—*Nautical Gazette*, 18/4.

HOLLAND-AMERICA PIERS TAKEN BY THE GOVERNMENT.—*Project Under Way to Make Hoboken Largest Terminal on the Atlantic*.—The Holland-America line piers at Fifth Street and the Hudson River, Hoboken, were taken over by the government for the duration of the war, through an arrangement between the War Department and Captain Victor Larsen, president of the steamship company.

Negotiations are under way for the taking over of the piers of the Scandinavian-American and Ellerman-Wilson lines, which, when completed, will make Hoboken the greatest European shipping point on the Atlantic seaboard, second only to Bush Terminal in Brooklyn.

In a statement from the office of the superintendent of the Scandinavian-American line's piers, it was made plain the negotiations were well under way and that, while an agreement had not been reached as yet, definite action was expected shortly. One of the problems which have hindered the settlement has been the housing of Scandinavian shipping while in this port.

The development of Hoboken as the largest point of embarkation on the Atlantic seaboard began less than a year ago, when the government took over the piers of the Lamport-Holt line at Sixteenth Street. These were reconstructed to accommodate a greater amount of traffic, but the need of expansion became apparent within a short time.

It was then the Holland-America line piers, which lay further to the southeast, were chosen as the next development.

Negotiations were begun which ended in the government taking over the piers. They will be reconstructed, as were those of the Lamport-Holt line.

When the piers of the Scandinavian-American and Ellerman-Wilson lines are requisitioned the water front of Hoboken will be entirely under the control of the War Department. As a point of embarkation it will have facilities for shipping foodstuffs and supplies to the armies overseas which will equal those of Bush Terminal.—*N. Y. Herald*, 20/4.

FREE PORTS WANTED FOR "WAR AFTER WAR."—Business America is urging Congress to prepare the country for the "war after the war" for world trade. The first step was the passage of the Webb law which permits exporters to combine selling agencies without fear of anti-trust statutes. Now Congress is asked to provide "free ports" for United States waterfront zones into which goods may be imported without payment of duties

or customs inspection. In these "free ports" imported materials may be rehandled, repacked, mixed, cleaned or even manufactured and then exported to other countries.

Goods sent into the country from free ports will pay duty, of course. The tariff policy of the government is not to be affected in any way. The purpose of the "free ports" is to handle the world's transshipment business, which now amounts to billions yearly.

Foreign trade will sail hundreds of miles to avoid red tape and expense of a custom house. Free-trade England has built up much of her commercial prosperity because of this fact.

Germany is a protectionist country like America, but before the war she was cutting into Britain's transshipment business by maintaining the old free ports of Hamburg, Bremen and Lubeck. Within portions of the harbor fronts of these cities trade and manufacture is free. The only customs activity is prevention of smuggling into the interior.

The Federal Trade Commission will shortly recommend at least four free ports for the United States at New York, New Orleans, San Francisco and the Canal Zone.

Legislation, which probably will follow the commission's report, will be drawn to provide that any city may build and operate a free port as a public utility. Under strict regulation by either the government or the cities, private corporations will also be allowed to build and operate such ports and terminals.

The experience of Germany and Denmark shows that such zones are successful. As a rule, however, no great amount of manufacturing is carried on in them beyond the repacking, cleaning, mixing or classification of raw materials for re-export or for import into the country in which the free ports are located.

The movement of ships is speeded up by the elimination of customs inspection. The warehouses in the zones are the most important feature next to the docks, and usually carry immense stocks of goods, awaiting shipping orders.—*Baltimore Evening Sun*, 26/4.

POOLING OF SHIPS COMES TO FRONT.—The pooling and operation by an inter-allied shipping board of all tonnage now operated by the United States, Great Britain, France and Italy is being jointly discussed by these nations.

Distribution of tonnage as the war sweeps into its most desperate stage is becoming more and more a vital factor in the outcome. Differences of opinion as to whether food supplies or men should have priority have caused vast confusion in recent months with the rapidly changing situation in France.

Official diplomatic advices announced a meeting of the inter-allied economic committee in France to discuss the tonnage distribution.

Comparable to Foch's Command.—The pool plan would bring the same co-ordination in the shipping shortage that was brought on the western front by the appointment of General Foch as generalissimo of all Allied troops.

The plan is to put control of the world's commerce in the hands of an inter-allied board, with authority to direct shipments of supplies, food, munitions and perhaps even troops.

Probably 25,000,000 tons of shipping would be at the disposal of the board. The board would have authority to grant priority of shipments and to withhold shipments. Under present methods of operation each war government operates its ships to fetch and carry the food and supplies it needs for its own people. This sometimes works to delay other war governments. It also often spells waste of cargo space through duplication, cross hauls and operation of ships in ballast.

Would Save Wasted Space.—It is urged a supreme shipping authority would save this waste.

Officials at Washington were reluctant to discuss the proposal beyond saying it had been discussed. President Wilson will, of course, decide the fate of the proposal. He has not sanctioned it to date.—*Baltimore Evening Sun*, 25/4.

There is talk of the establishment of an American Lloyds on the ground that American shipping interests may be seriously handicapped in the post-war economic competition if we should have to depend on a primarily British undertaking for shipping intelligence and vessel ratings. Whatever else may be the outcome of the war it appears certain that the British Lloyds will no longer enjoy a virtual monopoly in its chosen field of activities. Less than a year ago representatives of German shipping and marine insurance interests met at Hamburg and declared that Lloyds was the backbone of Britain's economic war against Germany. Were Lloyds to carry out its threat of bringing no news of German vessels after the war and of refusing to mail any of their daily and weekly reports of vessel movements and casualties to Germany, German interests would suffer incalculable injury. The absence of reliable shipping intelligence would result in a total disorganization of the business of marine insurance and all branches of the import and export trade would be crippled. Hence to guard against such a grievous injury to Germany's foreign trade when economic competition was renewed it was determined to found a German shipping intelligence bureau after the pattern of Lloyds for the protection and maintenance of German interests all over the world. The cost of establishing such a corresponding institution was placed at 2,000,000 marks. In Holland, the Dutch Steamship Owners' Union is looking into the establishment of a Dutch classification bureau in order to do away with the present dependence of Netherlands shipowners on foreign bureaus when it comes to the construction of vessels. The creation of serious rivals to Lloyds after the war is therefore certain, and the United States will before long have to decide the question whether its best interests will not be served by founding an American institution of like character.—*Nautical Gazette*, 18/4.

ARMY

ARMY OF 3,000,000 IN FRANCE NOW IS DESIRED BY HOUSE.—“Three million men for Pershing in France.”

This is the goal which members of the House Military Affairs Committee hope to reach before the army appropriation bill is passed. This will be coupled with the creation of sufficient reserve to maintain an army of that size, no matter how long the war may last, if the bill goes through in accordance with the wishes of its advocates.

The size of the American Army is the one big question to be determined in the final consideration in committee of the army bill, which is to be taken up next week. Newton D. Baker, Secretary of War, will be the first official of the department to appear before the committee to advise with it regarding the number of men to be put into military service. He will be followed by Provost Marshal General Enoch S. Crowder, if the program now outlined by the Military Affairs Committee is followed.

If necessary, other high officials will be summoned later, all for the purpose of reaching a determination regarding the magnitude of the fighting force America is to put into the European battle line.

Ever since the German drive began sentiment in Congress for increasing the size of our army has been growing. It is about the only important provision in the army bill which was not whipped into shape by the Military Affairs Committee before Secretary Baker went to Europe for his survey of conditions there.

Representative Dent, democrat, of Alabama, chairman of the Military Affairs Committee, has stated many times that completion of the army bill awaited the return of the Secretary of War and that it could be finished

and reported to the House promptly after his recommendations were submitted.

The question of man power, however, was not at the acute stage when Secretary Baker left Europe that it has reached since then. Premier Lloyd George frankly has told the House of Commons that America must place more men in the field, that the age limit of the draft in England must be increased. Conscription in Ireland has been voted. These are desperate measures, and it has brought home to this country the fact that America must be ready to fill the vacancies created in the ranks of the Allies by the tremendous drain due to the Prussian onslaught.

Representative Ashton C. Shallenberger, democrat, of Nebraska, of the Military Committee, is one of the moving spirits in the committee for a proposal to increase the age limit to 40 years, and repeatedly has urged that an army of 3,000,000 men be put at the disposal of General Pershing. Representative Dent recently stated on the floor that should Secretary Baker say the word, he is ready to vote for a largely increased American Army.

It has been remarked frequently that although some formidable opposition to various bills affecting the operation of the Selective Draft law has appeared in the last two weeks, no one has vetoed a single objection to increasing the size of the army. Should the House Committee on Military Affairs report a bill carrying substantial increases, it is believed the House would enact it speedily.—*N. Y. Herald*, 11/5.

GENERAL CROWDER ASKS DRAFT BILL CHANGE.—Provost Marshal General Crowder to-day requested Congress to eliminate from the bill extending the draft of youths now 21 years of age, the amendment putting at the bottom of the eligible list those who would register under the measure, and asked that the bill basing draft quotas on the number of men in class I be amended to make its operation retroactive.

General Crowder made his request in letters to the chairmen of the Senate and House military committees.

Of the proposal to put the new registrants at the bottom of the list of eligibles, General Crowder said:

Says His Plan Fairest.—"The plan proposed by this office would result in these registrants being given order numbers scattered throughout the entire list of order numbers. This seems to be fairer than the plan proposed by the amendment. The result of the House amendment in many jurisdictions will be to delay the calling of these young men for a considerable time. In the meantime their status will have changed, they will have married or become integrated with the industries of the country.

"Moreover, it establishes a precedent which may be appealed to, provided aliens are registered under the provisions of the new legislation based upon treaties to be negotiated."

The plan to make the quota law retroactive would apply it to men of the new draft called while the legislation is pending. Delay in enactment of the legislation, General Crowder wrote, necessitated the retroactive feature.—*Washington Evening Star*, 30/4.

CHARLESTON TO BE MADE BIG SEAPORT AND ARMY DEPOT OF SOUTH ATLANTIC.—The United States Government has requisitioned 2000 acres of land at North Charleston and will immediately begin work on the government's development of Charleston into the principal seaport of the South Atlantic, at a cost of \$20,000,000. It is known that 4000 acres are eventually to be used by the government at North Charleston, the present 2000 acres for the purposes of the Quartermaster Department and the Ordnance Department, and other lands for a great base hospital and a remount station for 20,000 horses. Actual work on the remount station has already begun.

Permanent concrete warehouses and piers will be built for the Quartermaster Department. They will be hurried to completion for use during the war, but will continue to be used after the war. The plans call for a concrete pier, with a frontage on the Cooper River of between 3000 and 4000 feet, with facilities for handling the very largest vessels afloat and all kinds of freight.

Concrete warehouses will be built behind the pier, which will be erected in a continuous line, without slips, so that vessels will load and unload lengthwise. There will be room for continued expansion of this immense pier, it is understood. Major J. L. Lee, who has been in Charleston for some time awaiting orders, will be the engineer officer in charge of construction.

For the Ordnance Department large ammunition storage depots will be built and other construction probably undertaken. This, it is understood, will be on part of the 2000 acres already requisitioned.

The remount station, which will be for 20,000 horses and mules, will be rapidly constructed, work having already commenced. It will be equipped with corrals, quarters for the men, a large horse hospital and other buildings.

It is understood that about 600 acres will be used for the base hospital that is contemplated and that the hospital will have 10,000 beds and be thoroughly equipped.

The effects of these proposed developments are already being felt at North Charleston, which is a suburb of Charleston, and land nearby is selling rapidly to people who are expecting to build homes and business structures there. Two banks have already been chartered, a large church is about to be built and several stores have been announced.

The remount station will employ about 3000 men. The other developments will employ several thousands, it is believed, though no statement as to the numbers has yet been made.—*N. Y. Herald*, 10/5.

MEDALS AND INSIGNIA AUTHORIZED FOR U. S. SOLDIERS IN FRANCE, WITH ARMY RULES AND REGULATIONS GOVERNING THEIR BESTOWAL.—I. By direction of the President the following decorations and insignia are authorized:

(a) Distinguished-service cross.

A bronze cross of appropriate design and a ribbon to be worn in lieu thereof, to be awarded by the President, or in the name of the President, by the commanding general of the American Expeditionary Forces in Europe to any person who, while serving in any capacity with the army, shall hereafter distinguish himself or herself, or who, since April 6, 1917, has distinguished himself or herself, by extraordinary heroism in connection with military operations against an armed enemy of the United States under circumstances which do not justify the award of the medal of honor.

Service Medal and Chevrons.—(b) Distinguished-service medal.

A bronze medal of appropriate design, and a ribbon to be worn in lieu thereof, to be awarded by the President to any person who, while serving in any capacity with the army, shall hereafter distinguish himself or herself, or who, since April 6, 1917, has distinguished himself or herself by exceptionally meritorious service to the government in a duty of great responsibility in time of war or in connection with military operations against an armed enemy of the United States.

(c) War-service chevrons.

A gold chevron of standard material and design, to be worn on the lower half of the left sleeve of all uniform coats, except fatigue coats, by each officer and enlisted man who has served six months in the zone of the advance in the war, and an additional chevron for each six months of similar service thereafter. Officers and enlisted men of the Aviation Service on combat-flying duty in Europe will be credited for the war-service chevron with the time they may be on duty.

The Wound Chevron.—(d) Wound chevrons.

A gold chevron of pattern identical with that of the war-service chevron, to be worn on the lower half of the right sleeve of all uniform coats, except fatigue coats, by each officer and enlisted man who has received, or who may hereafter receive, a wound in action with the enemy which necessitates treatment by a medical officer, and an additional chevron for each additional wound; but not more than one chevron will be worn for two or more wounds received at the same time. Disablement by gas necessitating treatment by a medical officer shall be considered to be a wound within the meaning of this order.

Medals of Honor in France.—2. During the present emergency, whenever a recommendation for the award of the medal of honor reaches the commanding general of the American Expeditionary Forces in Europe, he is authorized to cable his recommendation for immediate action and to hold the papers until a reply is received. In the event that his recommendation is approved, he will note the action taken in his indorsement when forwarding the papers in the case and will present the medal to the recipient as the representative of the President, or will delegate a suitable officer to act in that capacity.

In any case where the person recommended for the award of the medal of honor is at the time of the recommendation apparently fatally wounded or so ill as to endanger his life, the commanding general of the Expeditionary Forces in Europe is authorized to act immediately upon the recommendation as the representative of the President, afterwards reporting his action by cable.

3. Whenever a recommendation for the award of the medal of honor is approved by cable, and whenever a report is received announcing the award of the distinguished-service cross by the commanding general of the American Expeditionary Forces in Europe, and whenever the distinguished-service medal is awarded, such award, with a statement of the circumstances in each case, will be announced in general orders of the War Department by the adjutant general of the army without unnecessary delay.

May Be Posthumously Awarded.—4. The distinguished-service cross and the distinguished-service medal may be awarded posthumously to persons killed in the performance of acts meriting such award or to persons whose death from any cause may have occurred prior to such award. The medal so awarded will be issued to the nearest relative of the deceased person.

5. No individual will be entitled to more than one distinguished-service cross or one distinguished-service medal, but each additional citation in War Department orders for conduct or service that would warrant the award of either of these decorations will entitle the person so cited to wear upon the ribband of the decoration and upon the corresponding ribbon a bronze oak leaf of approved design, and the right to wear such oak leaf will be announced as a part of the citation. Other citations for gallantry in action published in orders issued from the headquarters of a force commanded by a general officer will be indicated in each case by a silver star three-sixteenths of an inch in diameter worn upon the ribband of the distinguished-service cross and upon the corresponding ribbon.

Forwarding of Recommendations.—6. Recommendations for the award of the distinguished-service medal will be forwarded to the adjutant general of the army through regular channels.

7. When an officer or enlisted man is admitted to a hospital for treatment of a wound, or when an officer or enlisted man is treated for a wound without being admitted to a hospital, the commanding officer of the hospital, or, in the latter case, the medical officer who treats the wound, will furnish the commanding officer of the wounded person with a certificate describing briefly the nature of the wound and certifying to the necessity of the treatment. This information may be furnished to commanders of higher units in the form of certified lists, and will be transmitted by them to the commanding officers concerned.

8. Commanding officers will forward to the adjutant general of the army, through military channels, lists in duplicate of those officers and enlisted men of their commands who have been honorably wounded in action, with a statement in the case of each individual, showing time and place wounds were received and organization in which they were then serving. Whenever a report is made of an action, it will be accompanied by the above-described list, and by certified copies of the medical officers' statements described in paragraph 7.

Granting Rights to Wear.—9. Upon receipt of lists of wounded the commanding general of the American Expeditionary Forces in Europe is authorized to grant the right to wear the wound chevron to the persons concerned, and he will note his action by indorsement in forwarding the papers.

10. The right to wear the wound chevron shall be confined to those who are authorized to do so by letter from the adjutant general of the army or from the commanding general of the American Expeditionary Forces in Europe.

11. The war-service chevron and the wound chevron shall be as described in paragraphs 13½ and 84½, Special Regulations No. 42 (Uniform Specifications) (see Changes No. 2); will be worn as described in paragraph 74½, Special Regulations No. 41 (Uniform Regulations) (see Changes No. 2); and will be furnished as directed in sub-paragraph 6 of paragraph 66, Compilation of General Orders, Circulars and Bulletins, War Department, 1881-1915.

Verifying Rights to Wear.—12. Requests for the issue or purchase of these chevrons will be accompanied by a list of the persons for whom they are desired, for the information of the commanding officer who authorizes the issue. The officer, before approving a requisition or a purchase, will verify the right of the persons concerned to wear the chevrons requested. Requests for authority to wear the wound chevron on account of wounds received prior to the present war will be forwarded with all available evidence to the adjutant general of the army for verification through the War Department records and appropriate action.

13. Section XI, General Orders No. 134, War Department, 1917, is rescinded.

(210.5, A. G. O.)

By order of the Secretary of War:

JOHN BIDDLE,
Major General, Acting Chief of Staff.

Official:

H. P. McCAIN,
The Adjutant General.

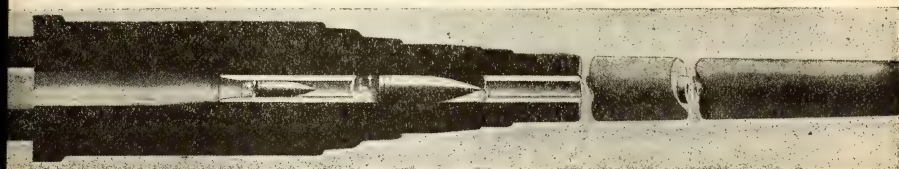
ORDNANCE AND GUNNERY

VELOCITY AND RANGE OF GUNS, II.—*How Super-Range Can Be Secured with Existing High-Powered Rifles.*—By J. Bernard Walker.—In an article on "Velocity and Range of Guns," three different methods of securing extreme range were considered—namely, a gun using a compound shell, a gun using a sub-caliber shell, and a gun of standard type, but with a large powder chamber and extremely long barrel.

As regards the compound shell, it was shown that, because of gyroscopic action the inaccuracy would be so great as to render the gun useless. In addition to that fundamental difficulty, the structure of each super-caliber shell would have to be made of such thickness and strength to resist the bursting stresses of the firing charge that each successive shell would be of very greatly reduced diameter, and the final, explosive shell that was intended to complete the trajectory would be so small as to be useless even for bombarding purposes. If the final shell were to be of any serviceable

size, such as 8 to 10 inches, the diameter of the compound shell, as assembled for firing, would be so great as to require the construction of a gun far exceeding in weight and length the heaviest artillery of the present day. In addition to the great thickness necessary in the wall of each shell, to enable it to act as a gun for the shell within it, there would be the difficulty of the large powder spaces required to give the desired velocities. These powder chambers, if we can call them that, would be so large that the compound shell would be of an absolutely prohibitive total length. In this connection, the space required for the powder charge of one of the most powerful guns in existence is very significant. The cartridge for this particular gun is nearly 18 inches in diameter, weighs about one-third of a ton, and is no less than 10 feet in length. So we are safe in stating that no practical gunmaker will ever attempt to construct a long-range gun upon this principle.

Another problem that would have to be solved is that of providing a reliable time fuse for firing the successive shells at the desired point in the trajectory. The elevations attained by the shells of anti-aircraft guns are moderate compared with those which the shells of a 75-mile range gun must attain. Yet great difficulty has been experienced in providing fuses



A 15-INCH 50-CALIBER KRUPP NAVAL GUN, SUB-CALIBERED TO 9.4 INCHES.

It is understood that the Germans are utilizing some 15-inch guns, built for their latest battleships, for bombarding Paris. This is done by inserting a liner (shown above in white) and boring it to take a 9.4-inch shell. Krupp claims for the 15-inch shell a velocity of 3100 foot-seconds. With a full charge of suitable powder the 9.4-inch shell would have a velocity of 6200 foot-seconds. In the drawing the liner is broken away and a 15-inch shell inserted for comparison.

that will function reliably at the extreme ranges of anti-aircraft weapons; although since the outbreak of the war, the efforts of many inventors have been directed to the problem. The rate of burning of a time fuse depends greatly upon the density of the air. The irregular density of the atmosphere at the summit of the trajectory of high-angle fire howitzers and anti-aircraft weapons is a condition that has greatly complicated the calculations of the artillerist.

Secondly, as regards the use of a sub-caliber shell in a large-caliber gun, while it is true that the velocities vary inversely as the square root of the weight of the shells, and, as has been shown in the case of a 16-inch howitzer, it would be possible to secure high velocity with existing guns, it has not been possible to provide a cradle that will stand up under the enormous pressures and the severe torsional stresses to which it is subjected. Furthermore, great difficulty has been experienced in releasing the shell from its cradle, and the flight of such shells has proved to be extremely erratic.

The third method suggested, namely, that the Germans had built an entirely new gun with large powder chamber and possibly 100 calibers of length, is the most reasonable proposition of the three; but since the article referred to was written we have learned on good authority that the Germans

have not built a special gun, but have made use of some of the new 15-inch 50-caliber guns which the Krupp works have built for one of the latest German battleships. It is stated that two or three of these guns have been sub-calibered by inserting a tube for the full length of the bore, so as to make it possible to use a smaller shell, having behind it a very large charge of powder, and driven through an exceptionally long path down the bore. As to the size of the sub-caliber shell, reports from Paris are contradictory—some stating that an 8.8-inch shell is being used and others a 9.5. The ordnance tables of the Krupp works include an 8.2-inch gun and a 9.4-inch gun. It is probably that the 9.4-inch shell is employed.

It would be perfectly feasible to heat the gun and insert a liner having an external diameter slightly larger than the bore of the gun (15 inches), and secure it firmly in position by the well-known method of shrinkage. The tube could then be bored to 9.4 inches and rifled. In this case the enormous charge for a 15-inch gun would be available for driving a 9.4-inch projectile through a gun that was 80 calibers long. Of course, it would be necessary to design a quicker-burning powder, in order to make sure that the whole charge was burned before the shell left the muzzle. The 15-inch shell weighs 1680 pounds, and according to the Krupp tables it has a muzzle velocity of 3100 feet per second (there is much skepticism as to this high velocity among ordnance men in this country, but we will assume that the Krupps are doing it). The 9.4-inch weighs 420 pounds. The square root of 1680 is 41 and the square root of 420 is 20.5, and accepting 3100 feet per second as the velocity of the heavier shell, we get a velocity for the 9.4-inch shell of 6200 feet per second.

If it be true that some of the guns built for one of the latest battleships of the German high seas fleet have been diverted to the German front in Picardy, we are justified in believing that the German Admiralty is not contemplating, at least for the present, any sortie into the North Sea for the purpose of breaking the blockade.

If it were possible to construct a cradle that was sufficiently strong to stand up to its work, and that would disengage itself from the shell without affecting the flight of the latter, it would be possible to fire a larger and more destructive shell than the 9.4-inch shell now being thrown into Paris. Take, for instance, our new army 16-inch gun, which is designed to fire a 400-pound projectile with a velocity of 2700 feet per second. If a 12-inch projectile weighing, with its cradle, 1100 pounds, were fired from this gun, it would be found by the formula referred to above, that the shell would have a velocity at the muzzle of about 4000 feet per second.

The possibilities in the direction of super-range, even greater than that obtained by the German gun, were made the subject of study by the Bureau of Ordnance of the Navy, and a design was drawn up for a gun which would give ranges far superior to that attained by the gun now firing upon Paris. The study of the problem, however, was merely an academic one: for our ordnance officers realize that such a gun has no tactical value, and they know that the United States will never so far depart from its standards of civilized warfare as to bombard indiscriminately the inhabitants of a great city.—*Scientific American*, 27/4.

THE LONG-RANGE GUN.—The following particulars of the long-range guns, and their projectiles, which are bombarding Paris, are given by *Le Génie Civil*. The shell is about 210 mm. in diameter, and its real length not more than half a meter, but it is lengthened by a false nose of sheet-metal, which increases the length to about 900 mm. It has a fuse at the base, and, possibly, one also at the nose, to double the chances of a burst. As a matter of fact, not a single unexploded shell has yet been found. It has two copper driving bands, between which are two bands in the steel, cut with rifling grooves. Its weight is between 100 and 120 kilos. The thickness of the walls being between 30 and 40 mm., the internal capacity is no more than 6 liters, sufficient for only 10 to 11 kilos of high explosive.

From this fact it results that the shell is broken into few pieces, and the fatalities caused by it are relatively small.

The initial velocity of the projectile must be between 1200 and 1400 meters per second, and our contemporary recalls that 20 years ago a gun of 164.7 mm. was constructed at the National Foundry at Rouelle, and was fired with a pressure of 2800 kilos per square centimeter, and gave a muzzle velocity of 1200 meters per second. Its length was 90 calibers. It was only tested at low angles of elevation, and not for maximum range. It is shown by an expert artilleryman, who writes for the *Génie Civil*, that the problem turns largely upon the selection of a very slow burning powder, so that a high pressure may be carried right up to the muzzle. It is pointed out that the wear of the gun, even though the maximum pressure does not exceed that usually employed, is likely to be very rapid. The gun is assumed to be 110 calibers long, the charge 183.6 kilos, and the maximum pressure 2500 kilos per square centimeter, say, 15 tons per square inch.—*Engineer*, 12/4.

WILL BUILD 100-MILE GUN.—Connecting Mr. Gary's announcement with the *Herald* despatch of several days ago in connection with the new large U. S. gun plant, it was recalled in the financial district that reports had been current of a new super-gun which the government had been testing and which had been manufactured near Philadelphia. Several banking houses learned that the new gun, which then had passed two tests, was expected to have a range of a hundred miles.—*N. Y. Herald*, 10/5.

THE CREUSOT 520-MILLIMETER WEAPON—THIS WAR'S MOST POWERFUL GUN.—The recent publicity given the long-range German gun has quite overshadowed the French 520-millimeter gun, which, after all, remains the most powerful gun now in use. Whereas, the German piece throws its shell some 75 miles, the French gun is relatively a howitzer hurling a huge shell a comparatively short distance. Practically speaking, it is a fort wrecker of proved powers.

For some time there had been rumors of a 520-millimeter gun employed by the French artillerymen, but ordnance experts and others familiar with the difficulties in the way of producing such a powerful piece of mobile artillery did not place much credence in the unofficial descriptions; they preferred to wait for some definite evidence.

It was not until the French official films presented the 520-millimeter gun to American audiences that ordnance experts and others were convinced that the huge mobile howitzer was a *fait accompli*. The accompanying photographs which have recently reached this country show one of these huge guns receiving the final touches at the Creusot works in France, and another similar gun in action. It appears that the gun is a howitzer mounted on a railroad carriage, and fires a shell measuring 20.47 inches in diameter. As a fort wrecker, this gun is undoubtedly without peer, the German 420-millimeter and the Austrian 300-millimeter howitzers having been outdone by a good margin. During the French attack on Fort Malmaison it is reported that a single 520-millimeter shell crumbled this permanent fortification upon which the Germans had spent so much time and labor.—*Scientific American*, 4/5.

During the past year the latest type of naval 16-inch gun was completed for our new battleships; it throws a projectile weighing 2100 pounds.—*Official Bulletin*, 30/4.

U. S. STEEL TO BUILD BIGGEST OF GUN PLANTS.—The largest ordnance and munitions plant in the world, probably surpassing in capacity the Krupps and the Bethlehem work combined, is to be built for America by the United States Steel Corporation.

Elbert H. Gary, chairman of the board of the corporation, made a formal announcement yesterday that it had undertaken the construction of such a plant "at the solicitation of the Secretary of War," confirming a despatch from the *Herald's* bureau in Washington several days ago that the Secretary of War had asked for \$4,000,000,000 for the construction of an ordnance plant by the steel corporation.

In that despatch it was explained the great sum was to be used solely for the construction of the plant, and that among the "big gun" products would be a super gun of astonishing range, "greater than any yet used," and that it would be manufactured in very large quantities.

Mr. Gary's Statement.—The statement issued by Mr. Gary follows:

"At the solicitation of the Secretary of War, the United States Steel Corporation has undertaken to construct and equip for and at the expense of the government upon a site to be located in the interior of the country a plant for the manufacture of cannon and projectiles of large sizes and in great quantities and to operate the same when finished.

"At best the time required will extend over a considerable period and the cost will be large, but the work will progress with all practicable speed and economy in the use of money will be practised. It is hoped and expected the results will be creditable to the country.

"The work will be in the immediate charge of a committee consisting of a vice-president and the controller of the corporation and eight others designated from the officers (presidents or vice-presidents) of the various manufacturing subsidiary companies, and all selected because of their education, experience and peculiar fitness. This committee will keep in close touch with the building and operating organization which is being formed, and with the officers of the Steel Corporation and with the War Department.

"Officers of the corporation and of subsidiary companies will receive no compensation for their services.

"Accurate books of account will be kept which, with all records, files and other documents and papers, will be open and subject to examination by government officials or other properly appointed representatives.

"General plans are being rapidly prepared and will soon be ready for examination by the Ordnance Department or other bureau, and when approved, the corporation will be given a free hand in construction and operation, holding itself responsible for the faithful performance of the duty imposed by the terms of the contract.

"The corporation, in consequence of the magnitude of its business, most of which, directly or indirectly, is in aid of the military necessities of the government and its allies, had hoped to avoid the necessity of engaging in work of the kind now entered upon, but was persuaded by the War Department that it was imperatively required under existing conditions."

To Turn Out Big Guns.—At Washington last night the War Department issued the following statement:

"The Secretary of War has entered into an arrangement with the United States Steel Corporation by which that corporation undertakes to construct and equip, for the government, a modern ordnance plant, upon a site located in the interior of the country, to be selected.

"A committee formed from officers of the corporation and its subsidiary companies, men fitted by education and experience, will be in immediate charge of the work. These men will receive no compensation for their services. The plant is to be built, equipped and operated at the expense of the government of the United States Steel Corporation without profit. Cannon of the largest calibers will be manufactured, as well as heavy projectiles in large quantities.

"While the United States Steel Corporation, like other steel manufacturers, is full of work and has always gladly undertaken production of finished materials wanted by the government, it was persuaded by the

Secretary of War to undertake this additional task, which it patriotically agreed to do, and has placed its best energies and the strength of its economic position at the disposal of the War Department."

Probably Near Pittsburg.—Neither the Steel Corporation nor the government was prepared to say where the great plant would be built nor exactly what it would produce, but it is understood in circles close to those at work on the project that the plant will be near Pittsburg and that it will produce field and coast defence guns of the largest caliber and shells for them.

That the plant is to be much larger than any other in the world is indicated by the request of the Secretary of War for Congress to provide \$4,000,000,000 to pay only the cost of construction.

Soon after the start of hostilities in Europe Mr. Gary announced the Steel Corporation would not enter the munitions field, but would content itself with supplying steel and other of its products to the Allies and to domestic consumers. Mr. Gary at that time, however, promised that in the event of the United States being drawn into the war the United States Steel Corporation would be prepared to place its entire facilities at the disposition of the government.

It was recognized in the steel trade that if those facilities were made available for gun making purposes, the Steel Corporation could easily outdo all other ordnance making plants in the world. The arrangement between the United States Steel Corporation and the government is regarded as being in line with Mr. Gary's promise.

Bethlehem Is Largest.—At present the largest ordnance plant in this country is that of the Bethlehem Steel Corporation. At the head of that company is Charles M. Schwab, Director General of the United States Emergency Fleet Corporation, who was the first president of the United States Steel Company.

Another large American ordnance plant is owned by the Midvale Steel and Ordnance Company, of which William Ellis Corey, who succeeded Mr. Schwab as president of the United States Steel Corporation, is the head.

Since war began the Bethlehem plant has been expanded to an extent that placed it ahead, according to its managers, of the Krupp works in Germany.

The new plant to be built by the United States Steel Corporation will be ready, it is expected, to start work in about 12 months.—*N. Y. Herald*, 10/5.

NEW TRENCH ENGINES ARE USED BY GERMANS.—A new model "minenwerfer," the terrible trench engine which hurls through the air without noise of discharge and with no other warning than a slight whizzing sound missiles charged with high explosives, has appeared in the German trenches. It is called the "flugelminenwerfer" and heaves a 24-cm. projectile, which weighs 212 pounds and is guided by four wings attached to the sides, any distance up to 1200 meters.

There are also other new models of "minenwerfers," heavy, medium and light. This weapon is very popular with the Germans for trench fighting, although the new regulations allow each battalion of infantry only four light pieces, instead of eight, as heretofore. The "minenwerfer" crews belong to the pioneer companies, are commanded by artillery officers and operate in strict connection with the infantry regiments. Infantrymen dislike exceedingly to see a "minenwerfer" take up position in their trench, for it means invariably a heavy reciprocal bombardment as soon as a few shells are fired. The "minenwerfer" operators cannot claim to belong to the most popular branch of the army.

The chapter of "minenwerfers" in the new German rulebook, "Regulations Governing Trench Warfare," is very instructive. Directions are given to divide carefully all missions between the artillery and the "minenwerfer," taking into account the possibilities of each arm and the end to be attained. "Minenwerfers" should be used in place of artillery every time

it is possible for short range destructive fires, barrages; annihilation fires and for worrying the enemy, as thereby considerable economy is realized. It is insisted that they be used for accompanying assaulting troops.

The information received concerning the number and location of the German aviation schools is rather contradictory. In addition to the army instruction camps, it is probable that each of the big aeroplane factories has a special school for pilots attached to it, where machines are tried out and put in shape and where student pilots come to begin their apprenticeship. The instruction of pilots is carried out in the interior of Germany. It is begun at an aviation school (military or civilian) and is completed at a depot escadrille.

Observers are trained in the schools of the interior of Germany or at the aviation parks in northern France. The training consists of conferences on tactics and technics and practical exercises. Conferences deal with the German and enemy aviations, wireless telegraphy, artillery fire regulating, aerial photography, weather service, flying by the compass and the stars, writing up of reports, etc.

The practical exercises include flights with and without tactical missions (profiting by the movements of troops which may be going on in the neighborhood), exercises in machine-gun firing at targets on the ground and exercises in aerial combat. During these combats, which last at least 15 minutes, the aeroplane attacked and the assailant machine photograph each other, which permits a later study to be made of the nature and usefulness of the maneuvers prescribed to the pilot by the observer.

The bomb throwers receive a special instruction. The student takes his seat in an elevated fuselage and, using a sight, drops arrows on an endless chain about 10 yards long and of a certain width, on which is painted a landscape and which moves under him at varied quicknesses.—*Evening Star*, 30/4.

GUNS COMPARED WITH TORPEDOES.—If the total losses among warships sustained by all the belligerents in the last three and a half years be reckoned up it will be found that the majority have been caused by torpedoes and mines. Gun-fire has accounted for comparatively few. Yet it would be erroneous to conclude from these figures that either the torpedo or the mine is a more formidable weapon than the gun. For obvious reasons, the record of the torpedo impresses the imagination of the non-technical public, and, doubtless, to many people the U-boat would be a more appropriate symbol of modern naval power than the battleship. But naval officers, with few exceptions, are convinced that the gun remains the supreme and decisive instrument of naval combat. And it is not difficult to show why this should be so. Within the past decade the science of under-water attack has certainly made remarkable progress. At the outbreak of the war the latest torpedoes were credited with a range of 10,000 to 12,000 yards, and with the power of traveling a distance of 3000 yards at a velocity of 45 to 50 knots. At the same time the explosive charge contained in the warhead had been so increased that a single hit was expected to prove fatal to anything afloat. No wonder, therefore, that the torpedo was viewed with respect, or that its influence led to drastic modifications in both strategy and tactics.

But, simultaneously with this great advance in the power of the torpedo, equally important, though less spectacular, progress was being made in the science of gunnery. Improvements, not so much in the gun itself as in sighting and control appliances, had in the course of a few years almost doubled the range at which fire could be opened with precision. Had the "decisive range" remained at 8000 yards, which was the distance most generally accepted, the torpedo would undoubtedly have been a most formidable factor, for, as its own range was well above this figure, it might have been employed with deadly effect by battleships against battleships, and shoals of torpedoes would have been racing through the water between the

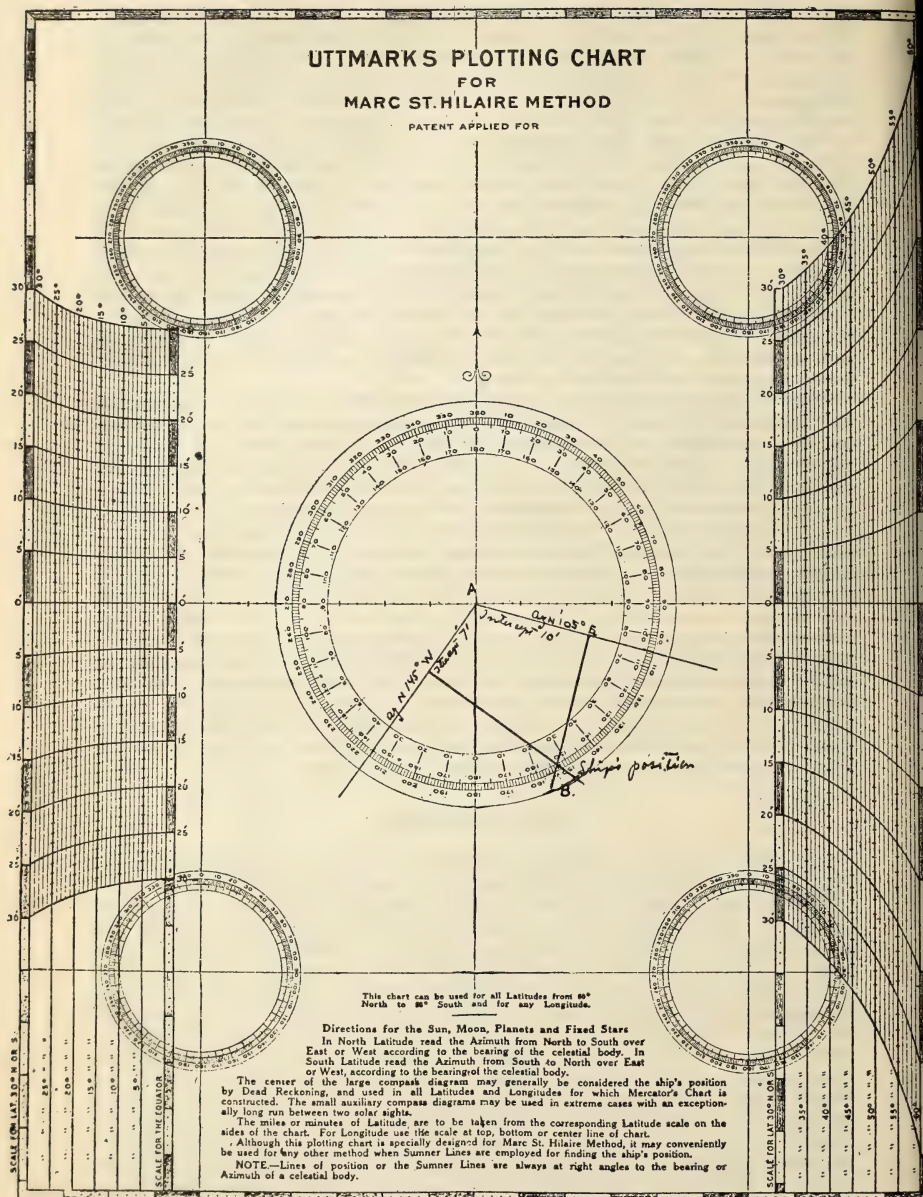
opposing lines while the shells roared overhead. But the increased range of the torpedo was practically neutralized by the corresponding extension in the range of heavy guns, and, with actions fought at an average distance of 15,000 yards, the torpedo was again relegated to its auxiliary place as the armament of the smaller fry. Under modern artillery conditions a ship may be attacked and disabled almost before it has risen above the horizon. In this war vessels have actually been disabled by projectiles fired at upwards of 10 miles. *Per contra*, there is no verified instance of a torpedo fired at more than three miles having reached a moving target. Every important naval engagement of the war has been decided exclusively by gun-fire, though on each occasion, but one, torpedo craft were present on both sides in large numbers. In the action in Heligoland Bight, on August 28, 1914; in the running fight off the Dogger Bank, on January 24, 1915; and in the fleet action off Jutland, nearly all the damage was due to gun-fire. Jutland was the classic instance of the failure of the torpedo as a rival of the gun. At that engagement there were present several hundred destroyers and submarines, and targets for them abounded; yet, on the British side, no vessel was sunk by this form of attack.

There is another reason why the torpedo has little prospect of ousting the gun within the calculable future. Naval constructors are at one in admitting the possibility of so designing a ship as to make her unsinkable by under-water explosion, and it is probable that the larger warships of the near future will be virtually impervious to torpedoes or mines. The problem presents no insurmountable difficulty; it is largely a question of pre-empting a few thousand tons of the displacement, and making sacrifices in other directions. But no such guarantee can be given of immunity from the effects of gun-fire. In existing capital ships the ratio of armor weight to displacement ranges from 20 per cent in armored cruisers to 30 per cent, and in some cases to nearly 35 per cent in battleships. Yet in spite of this tremendous proportion of dead weight represented by protection against gun-fire, no vessel afloat can be considered shell-proof. Several great capital ships, armored on the most modern principles, were destroyed at Jutland by salvos of projectiles not of the heaviest caliber. In short, the lesson taught by war experience is that the gun remains the supreme arbiter of naval combat, and that the torpedo does not yet come within measurable distance of it as a decisive factor.—*The Engineer*, 1/2.

NAVIGATION

THE NEW UTTMARK CHART.—The Marc St. Hilaire method of finding a ship's position at sea is one of the best in existence by employing the intersection of the Sumner lines, and is used extensively in the U. S. Navy and gaining in popularity in the merchant marine. When the stars and planets or moon are visible and the horizon clear it is possible to select two conveniently situated heavenly bodies from which to make observations and to plot position on the chart at any desired moment. There are also times during the day when the sun and moon are both visible, and occasionally the planet Venus is in such a position that it can be observed when it crosses the meridian. This enables obtaining latitude by the meridian observation and the ship's position by intersection of the Sumner lines. When the sun alone is visible it is necessary to make two observations with an interval of time. The point of intersection of two Sumner lines may be found by computation or by plotting on the chart, the latter being by far the more simple. Specially designed charts for plotting have the inconvenience, however, of being bulky; for example, to cover the latitude from the equator to 60 degrees, a set of 12 charts containing over 200 square feet of paper have been in use for many years. This difficulty is now obviated by Uttmark's plotting chart, invented by Captain F. E. Uttmark, of Uttmark's Nautical Academy, 8 State Street, this city. This chart covers all latitudes from 60 degrees north to 60 degrees south, and all longitudes.

UTTMARK'S PLOTTING CHART FOR MARC ST. HILAIRE METHOD PATENT APPLIED FOR

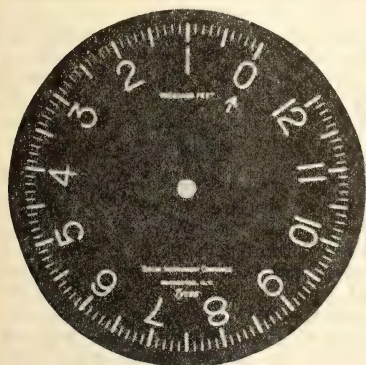


UTTMARK'S PLOTTING CHART.

—Marine Journal, 4/5.

It is less than 1 square foot in area, has a scale of 6 inches to 1 degree of longitude, as compared with a scale of 4 inches to 1 degree of longitude on the former charts, and is therefore 50 per cent more efficient than the scale on the plotting chart published by the U. S. Hydrographic Office. Captain Uttmark's chart may be used for plotting ship's position by any method using the Sumner lines.

MARVELITE, A NEW ELEMENT OF SAFETY FOR SHIPS IN THE SUBMARINE ZONE.—Under present conditions at sea there are times when a light on the bridge of a ship may have fatal consequences, revealing the location of the ship to the lurking submarine. But the telegraph, the compass, the zig-zag clock and other instruments must be visible to the navigator, and heretofore lights of some sort have been absolutely necessary. This source of danger has now been overcome by the application of marvelite to the dials of these instruments. Marvelite is a luminous compound, made with radium, which makes the dials clearly readable in the dark to anyone



ALTIMETER DIAL.



WET COMPASS DIAL.

standing near them, but does not give off light enough to be seen many feet away.

It has been used for some time on clocks, watches, compasses, and by the United States Government on barometers, altimeters and other instruments of the Signal Corps and the navy.

The manufacturers of marvelite (Cold Light Manufacturing Company, 558 West 158th Street, New York) have recently solved the problem of applying their material to wet compasses, so that it resists the action of alcohol or other fluids in which the dial floats. It is also used on the dial of the log.

There are various kinds of luminous materials, but only those containing radium will stand the test of time. Marvelite is permanently luminous for all practical purposes. The Cold Light Manufacturing Company secures its radium from the Schlesinger Radium Company (its parent company), one of the largest producers of pure radium in the world; and the honor and reputation of both companies are placed squarely back of the statement that marvelite is made with radium, which is the sole source of its luminosity.

There are so many uses for this material that have not yet been developed that the company maintains an experimental laboratory for the purpose of working out problems that are presented to it.—*Marine Journal*, 4/5.

RADIO

THE UNITED STATES NAVAL COMMUNICATION SERVICE operates all radio service; 5000 youths are studying radiotelegraphy at two naval schools.—*Official Bulletin*, 30/4.

HOW U-BOATS SEND WIRELESS MESSAGES 1000 MILES.—B. H. Winfield Secor.—The Germans have developed submarine radio-communication to a fine art—they had to. This is so for obvious reasons, chief among which is that the success of the U-boat campaign depends to a large extent on keeping in wireless communication with the individual sub-sea-boats and the possibility of certain of their number transmitting intelligence to the nearest land base.

At first the submarines made use of folding or telescopic masts which did not elevate the radio antenna very far above the deck—not more than 20 to 30 feet in most cases. For ordinary inter-communication between submarines this collapsible antenna served its purpose admirably. Where long ranges were to be negotiated, either in receiving or transmitting, however, it became a real problem.

One of the latest Teutonic improvements in this arm of the naval service is the utilization of balloons for elevating the U-boats' antenna wire to a height of 1000 feet and more. In this way vast distances can be covered and valuable intelligence sent by radio to a second relay submarine if necessary, so that it is not improbable that the news of ships' sailings from American ports could have been radioed to Germany by the aid of three or four U-boats.

The balloons, two in number, and fastened to a rigid equilibrium member, carry up the antenna wire to a height of several thousand feet if necessary. The antenna, at its base, is wound on a special electric-motor driven drum. This drum is instantly controlled by the throw of a switch, so that if a ship comes into view it can rapidly reel in the balloon antenna and the balloons are taken inside, hatches closed and the craft submerged—all in almost less time than it takes to tell about it. It is difficult for an enemy ship to see the balloons, as they are cleverly camouflaged, being painted partly white and partly blue, so that against the sky they are practically invisible. The antenna wire is, of course, quite fine and invisible at even a short distance away.

It has been a mooted question for some time as to just how far such a radio-equipped sub-sea fighter could send a message. The receiving range with such a balloon suspended aerial is easily several thousand miles, using modern amplifiers and other refinements in the radio art. The writer asked several well-known radio experts their opinion on the possible sending and receiving activity of a balloon-aerial equipped U-boat and they practically all agreed with the ideas expressed by Mr. F. H. Kroger, chief engineer of one of the leading American radio companies, that, with fair weather conditions, and with the proper radio transmitting apparatus tuned to a high wave length, it would be possible for the submarine to send a wireless message 2000 miles, and possibly 3000 to 4000 miles under extremely favorable conditions. The transmitting set used might, of course, be a special one rated at 15 to 25 kilowatts.

If the sub-sea-boat wanted to transmit an important message she would in all likelihood choose the night-time. She could then emerge and fly her balloon aerial with reasonable safety. And for a long-range message requiring as much energy as mentioned above, it should be remembered that there is available all the engine power required. All that would have to be done would be to connect up the high capacity dynamo to these engines, and this in turn to the special high-power radio transmitter. Such a set, including the dynamo, would not occupy such a large space as might be imagined off-hand. Also the newer U-boats are veritable submarine-cruisers, several hundred feet in length, which, of course, gives a much greater space for the radio equipment.

Many ingenious folding and other types of masts have been perfected for medium and short-range radio work on the submarine. An interesting practical telescope mast was patented by a Yankee inventor several years ago. The inventor, Mr. Joseph Raes, covered several modifications of the basic idea in his patent. In one type a continuous flexible metal cable is used. When a pull, as produced by a motor, is applied to the lower end of the cable, it causes all of the sliding telescopic members to be elevated. The upper end of the cable is secured to the bottom of the top telescopic member. When pressure is removed on the cable the mast descends by gravity.

A similar type telescopic mast has the individual sections raised and lowered by a clever arrangement of gears and shafts. This elevating scheme would be considerably slower than the previous cable-operated type.

The author suggests herewith a pneumatic telescopic radio mast. This is similar in principle to the pneumatic (compressed air) lifting cranes used in manufacturing plants, foundries, etc. With the proper pressure of compressed air, it is only necessary to close the suction blower pipe valve, open the high pressure air valve attached to the pipe line from compressed air tank or flasks, and the mast rises up by expansion of the air within it. When it is desired to lower the mast quickly, the compressed air valve is closed and the suction blower line valve slowly opened; the air is thus removed and the mast collapsed. Ordinarily, no suction would be required to lower the mast; merely a valve opening to the atmosphere through which the compressed air could rush to the outer air.

An ingenious collapsible radio mast was invented in Germany some years ago, and several of them have been used in this country. It was, perhaps, the lightest ever designed thus far—possibly too light for submarine requirements—but it possessed the element of speed. It employed four flexible strips of metal rolled on drums at the base. These strips were notched on both edges, and when the handle was turned the four notched strips of thin steel intermeshed with each other, making a lock-cornered square tubular mast about 8 inches square. It was found possible to raise a platform containing two men on it to a height of 80 feet for observation purposes when necessary. Two men could raise the mast in a short time by turning a geared crank handle.

An interesting feature not generally known is that submarines are now fitted with submarine telegraph apparatus, which operates by means of sound waves sent through the water from powerful electric vibrators mounted on the hull of the submarine. Sensitive microphones suitably mounted on either side of the hull enable the commander to tell when a ship is approaching, even at a considerable distance, by the sound of her propellers, which is transmitted through the water.

Then there is the latest safety feature—the telephone buoy. If the submarine should sink and become unmanageable, the crew can pull a lever which releases the telephone buoy, which rises to the surface of the water. Any craft passing in the vicinity of the sunken sub-sea-boat can open this buoy and, by means of the telephone inside it, speak to the imprisoned crew. Submarines send out sound signals of distress through the water also, which may be intercepted by another or by a warship or steamer.—*Electrical Experimenter Magazine*.—*Baltimore Sun*, 28/4.

ENGINEERING

ELECTRIC WELDING IN PLACE OF RIVETING.—The proposal to use electric welding in place of rivets in securing the plating of a ship, is an attractive proposition if it can be done successfully, and we understand that tests which were recently made in the presence of the representatives of the Shipping Board have been so satisfactory that one of the engineers of the Emergency Fleet Corporation has been sent to Newark where the system

is to be tried on the 9500-ton ship which is about to be built by the Federal Ship Building Corporation of Newark, N. J. According to the dispatch, a low voltage is used and the current is applied to the metal through the ends of large forceps which press the sheets firmly together after the metal has become sufficiently heated to effect a weld.—*Scientific American*, 27/4.

METHOD OF TESTING LUBRICATING OILS.—Although it may not be possible to give an exact definition of the lubricating power of an oil nor to attempt to employ a method for measuring this important property, it is found that it is directly connected with viscosity. It is well known that the viscosity of liquids can be observed by the Poiseuille method, by measuring the rate of flow through a capillary tube, and making use of a suitable formula which takes account of the quantity of liquid delivered per unit of time, the radius of the section, length of the tube, and pressure on the oil, whence is obtained a coefficient representing the viscosity. This latter decreases rapidly as the temperature rises. In practice, comparison is made of the viscosity of the product under observation with standard types of oils by passing the oil through a tube at the same pressure and measuring the flow. It is of interest to make such tests at different temperatures, for in the case of an oil whose viscosity decreases too quickly when the temperature rises, there is danger that it will cease to lubricate when heating occurs.

At a recent meeting of the French Physical Society, M. René Dubrisay proposed a simple device for making tests upon lubricating oils, and it gives sufficiently exact results. He makes use of a pipette containing an upper and a lower bulb of about 2 c. c. each, joined by a straight portion. A short piece of tube projects above the upper bulb, upon which is fitted a piece of rubber tube with a pinch cock. Below the lower bulb is also a short length of tube for outflow of liquid. Near the rubber tube is an upper mark, A, and between the two bulbs the marks B and C. The pipette is plunged in oil and taken up full, the upper surface of the oil being made to coincide with the top mark A; the filled pipette is then dipped into a vessel of water and left until the temperature reaches an equilibrium. Then the pipette is held by means of a support so as to bring the lower mark C at the level of the surface of the water, and the cock is opened so as to let the oil flow out. The time in seconds is counted which is taken for the oil to descend from A to B. As the variations in density between different oils are slight, the pressures of flow are practically the same in all cases. Again, the temperature can be closely measured, and it is an easy matter to operate with a series of temperatures throughout a wide range.

The method has the following advantages: The outflow from the end is always visible. A uniform temperature is obtained in the whole mass at the start, and this does not vary appreciably during the experiment. However, it may be asked, since the outflow takes place in water, whether the results are comparable with those usually obtained, and whether the present measurements of viscosity have a practical value. But the author made a series of tests upon a number of common lubricating oils, first with the classical Barbey apparatus and then with the present simple method. The curves obtained in the two cases have practically the same appearance, and in both methods the oils are classified in the same order. From these tests, the value of the author's method appears to be established. One practical point to be noted is that the new device can be used to find out at what temperature the oil ceases to flow, under a uniform pressure, and this test will be of value in the case of oils which are used in cold weather for lubrication of mechanical parts working in the open air.—*Scientific American*, 27/4.

ENGINEERING RESEARCH ON AIR PUMPS BY THE NORTH-EAST COAST INSTITUTION OF ENGINEERS AND SHIPBUILDERS.—The important departure by the North-East Coast Institution of Engineers and Shipbuilders in ap-

pointing a committee of expert engineers to test apparatus offered by manufacturers and accepted by the Council has resulted in a very comprehensive report on the working of air pumps such as are used in connection with the condenser plant of steam engines. The manufacturers in this case were Messrs. Richardsons, Westgarth and Co., Ltd., and the tests were carried out at their Hartlepool works.

The report, presenting as it does authoritative and reliable data, should prove of great value to engineers, especially with reference to the production of high vacuum for steam turbines and to the more economical production of low vacuum for cargo vessels; it definitely marks the opening up by a scientific institution of a new and most valuable field of activity, and there can be little doubt that the example which the North-East Coast Institution has set will be followed in other parts of the country, so that, ultimately, organized scientific research in engineering and other branches of industry will become active and general instead of, as at present, passive and exceptional.

The investigations undertaken by the Institution will include air pumps of the reciprocating type and of the rotary and jet types. The present report deals with tests made on pumps of the reciprocating type only, and the point of chief technical interest is the fact that the tests have demonstrated that remarkable influence in the withdrawal of air from a condenser is possessed by a steam jet or a series of jets when used in combination with such pumps. The original conception of combining a steam jet with an air pump was due to Mr. James Atkinson, of London, who in 1886 proposed it in connection with the cooling of liquids under high vacuum. In 1902 it was developed by Sir Charles Parsons in his vacuum augmentor for use with steam engine condensers, and at later dates has been further considerably improved by Mr. D. B. Morison, of Hartlepool. These improvements, known as the kinetic system, are dealt with in the report, together with the "wet and dry" and other systems now in general use.

Special attention has been given to air pumps and condensers in recent years, which is primarily due to the influence of vacuum on the steam economy of turbines, an influence which is greater than is generally realized. For example, in the case of high-pressure turbines an increase in vacuum from 27 inches to 29 inches results, in a suitably designed turbine, in a gain in steam economy of 13 per cent, and in the case of exhaust steam turbines the same increase effects a possible saving of no less than 22 per cent.

According to present practice, there are many ways of withdrawing air from a condenser, as by reciprocating and rotary pumps and by steam and water ejectors, but in view of the general adoption of geared turbines for the mercantile marine as soon as conditions permit, authentic tests on any apparatus for the production of high vacuum which is so essential for the economy and efficiency of this system of marine propulsion, are of unusual value at the present time.

From a technical standpoint, the report demonstrates beyond question that no mechanical contrivance is so simple and so efficient as a steam jet for compressing a large volume of highly attenuated air through a small degree of compression, and, as is already well known to engineers, a reciprocating air pump is a very efficient means for discharging moderate volumes under a high degree of compression. Consequently, the correct solution of the problem of air discharge from a condenser is to withdraw a large volume of aerated vapor by means of one or more steam jets and compress it through the range of compression in which the steam jet works with very high economy and then pass it on at such an absolute pressure that an air pump or other device can discharge it to the atmosphere also with very high economy.

It is interesting to note that mainly with the production of high vacuum such as is required for steam turbines, the report makes it clear that, for

the production of low vacuum such as is standard for the reciprocating engines of cargo vessels, the jet system may be even more effective. From the standpoint of economy, the effects of the adoption of the jet system are evidently extremely valuable. As is well known, a reciprocating air pump is a highly important auxiliary on a steamship. Its cost depends on its size; its wear and tear on its speed of working; and its economy in operation on the quantity of steam that it uses. The report shows that for a given duty the combination of a steam jet on the Kinetic system will allow the speed of a given pump to be reduced from 60 strokes per minute to 20 and the consumption of steam to be reduced by one-third, the pump mechanism remaining exactly as at present. Alternatively and obviously, an independently-driven pump may be made smaller for a given duty, or, in the case of cargo vessels in which the air pump is driven by the main engines, the entire economic influence of the steam jet may be utilized in reducing the size of the main condenser and the pumps in connection therewith. Herein lies the present value of the report.

At no time in the industrial history of Great Britain have savings in the use of labor and of metals been of such paramount importance as now. Apart altogether from the technical value of the results obtained, the investigations just completed indicate how such savings can be made in the manufacture of a particular part of the equipment of a steamship. The lead given by the North-East Coast Institution in the matter of active research, with practical demonstration of how labor and material can be saved in manufacture, and, as in this case, higher efficiency can be obtained in operation, becomes, therefore, of national importance and should at once be followed by every engineering institution in the kingdom.

The committee appointed by the council to carry out the tests outlined above consisted of: Mr. Edwin Orde, of Messrs. Armstrong, Whitworth and Co., President of the North-East Coast Institution of Engineers and Shipbuilders; Dr. Morrow, M. Sc., of Armstrong College, the well-known authority on steam turbines; and Mr. Waldie Cairns, M. Sc., Consulting Engineer, of Newcastle-on-Tyne.—*Page's Engineering Weekly*, 28/12/17.

METALLURGY OF FERRO CHROMIUM.—By R. J. Anderson.—Ferro chromium, like ferro silicon, was one of the pioneer alloys made in the electric furnace at the time when this appliance was first used for the manufacture of the ferro products. The use of chromium in alloy steels has markedly increased, and its employment promises to further increase on account of the special properties it confers upon the metal. Chromium steels are well adapted for use in the manufacture of armor plate and for armor-piercing projectiles, as well as for automobile parts, and in other cases where great hardness and high tensile strength are desired. In combination with nickel, chromium forms the now well-known chrome-nickel steel of the trade. Recently it has been employed with tungsten for magnet purposes.

Prior to the introduction of the high-temperature electric-melting furnace, the manufacture of ferro chromium was performed almost entirely in the blast-furnace stack, although a smaller amount was made in the crucible. Crucible manufacture gives high-tenor alloys, but several concomitant disadvantages are present. Only small charges can be fired at a time, the crucible cost is high, as special and expensive pots are required, and the alloys, though rich in chromium, are also comparatively high in impurities. The product is, therefore, not always satisfactory. For commercial purposes, the electric furnace affords a satisfactory appliance in which alloys high in chromium tenor and low in impurities can be smelted. The large quantities demanded in steel metallurgy for chromium steel production are now made in the electric furnace in the United States, Germany and elsewhere. The modern ferro chromium is a high-percentage alloy containing 60 per cent chromium or more, and the physical properties are a function of the amount of carbon present.

Only a small amount of ferro-chromium is made in the blast furnace at the present writing, for the reason that the electric furnace is more efficient where the power cost is low, and, further, the electric furnace turns out a better product. When ferro chromium is made in the blast furnace it requires a heavy fuel consumption for its successful manufacture; about three tons of fuel per ton of 40 per cent alloy are used. The modern method of making ferro chromium is in the electric furnace, although a lesser quantity is produced by the thermit method. Generally speaking, the iron-chromium alloy produced in the electric furnace analyzes about 60 to 65 per cent chromium and 5 to 9 per cent carbon.—*Page's Engineering Weekly*, 28/12/17.

SUBMARINES

U-BOAT DETECTOR DECLARED SOLUTION OF SUBMARINE PROBLEM.—Elimination of the submarine as a potent factor in warfare is predicted by George Harvey, editor of the *War Weekly* of the *North American Review*, in the current issue of that publication.

A new contrivance devised by American inventors and produced in this country is the instrument which bids fair to sweep the U-boat from the seas, or at least so to minimize its destructive powers that it will cease to be a material weapon, such as has carried on its piratical campaign since the beginning of the great conflict.

The invention apparently is the product of long experimenting, its function being to locate prowling undersea boats from a distance, thus preparing the larger vessels for the attack. The announcement by Mr. Harvey, printed under a Washington date, reads:

"We have the distinguished privilege and supreme satisfaction of announcing that the problem of locating the exact position of a submarine from a ship, at a distance which for obvious reasons cannot be mentioned, has been solved by American inventive genius. This is not a guess based upon experiment. It is a fact demonstrated by actual experience. While the contrivance does not presage the complete extirpation of the pest, it does virtually guarantee its ultimate elimination as a material force in piracy."

The *War Weekly* does not divulge the date of the discovery or the location of its first successful trial.

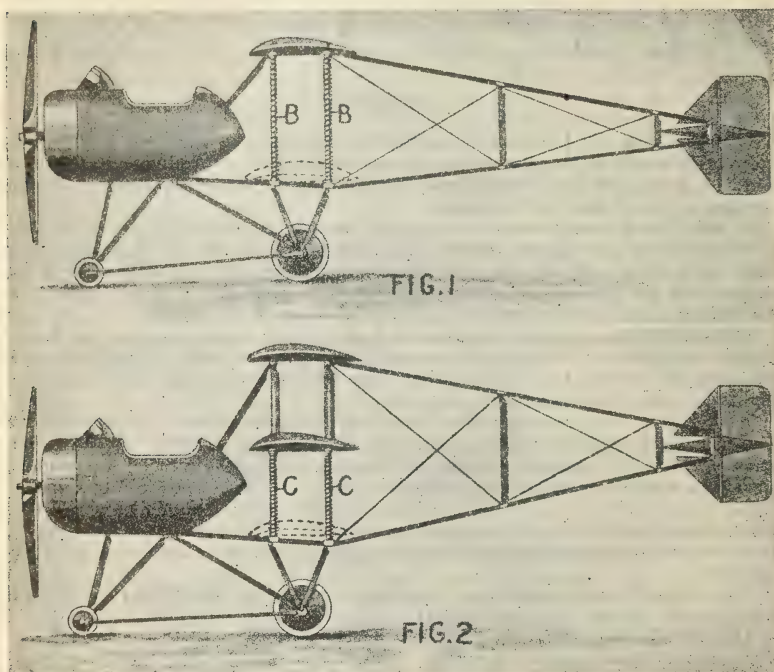
Thomas Robbins, of No. 144 East Fifty-sixth Street, this city, who is secretary of the Naval Consulting Board, was asked about the invention, but declined to discuss any of its features or reveal the identity of its inventors. He did not deny that such a contrivance had been successfully tested.

AERONAUTICS

ELIMINATING A WING TO INCREASE AIRPLANE'S SPEED.—Decrease the wing surface of an airplane and you increase its speed at the expense of lifting power. With this fact in mind, Edward Victor Hammond, of Balham, Surrey, England, has worked out the ingenious airplane arrangement depicted in the accompanying drawings. His invention, it will be noted, provides means whereby the lifting or weight-carrying capacity of airplanes, and also the speed and climbing abilities, can be varied as desired. The two drawings show, respectively, the arrangement for a biplane and a triplane. In a biplane machine the inventor causes the lower plane or planes to be raised into such a position as to close firmly against the underside of the top plane or planes, by means of revolving the interplane struts *B*, thus transforming a biplane into a monoplane. In a triplane machine the lowest plane or planes are caused to be raised into such a position as to close firmly against the underside of the center plane or

planes, thereby transforming a triplane into a biplane. In both these instances the closing of the plane is brought about by revolving the interplane struts, which struts are shown at *B* and at *C*.

The interplane struts in Mr. Hammond's plans are threaded with a screw thread for their whole length in the case of the biplane machine. In the triplane the screwed interplane struts are threaded on their lower halves, the screwed struts passing through sockets in the collapsible planes. It will be obvious that when the threaded interplane struts are revolved by any



SCHEMATIC PLANS FOR CONVERTING A BIPLANE INTO A MONOPLANE AND A TRIPLANE INTO A BIPLANE WHILE IN FLIGHT SO AS TO INCREASE SPEED.

suitable means, the collapsible plane or planes will be lowered or raised in accordance with the direction of motion of the operating gear.—*Scientific American*, 4/5.

THE POWER PLANT FOR ALTITUDE FLYING.—By E. H. Sherbondy.—One of the most important strategic phases of the war to-day has become the destruction of enemy military and naval bases, systems of transportation, bridges, etc.

We all know that the only one thing that could have prevented the Germans from carrying out or continuing the recent drive would have been the destruction of the bridges on the Rhine.

To destroy the bridges on the Rhine means bombing those bridges during the daytime. To do this means going over hundreds of miles of embattled forces, hostile aeroplanes, and anti-aircraft guns.

The only way to reach the Rhine bridges is to do what the Germans have done, to some extent, in bombing London and Paris during the past year.

They flew at such a great height that they were not detected until they came down over London and Paris and dropped their bombs.

We must now think in terms of rising to heights over 25,000 feet, so as to pass the enemy's lines and over the enemy's aerial patrols undetected.

Flying at altitudes of over 25,000 feet can only be done by producing a motor capable of giving sufficient power to climb above these altitudes. This may be carried out in two ways:

(1) By developing a fuel impregnated with the oxygen required for combustion.

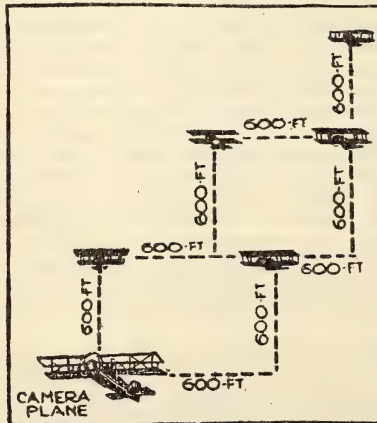
(2) By pre-compressing the air required for combustion so as to have the same number of pounds of oxygen available for combustion that are available at sea level.

The Aircraft of the Near Future Will Have Two Power Plants for Altitude Work.—The aircraft of the future will have two power plants for altitude work, one of which will be adapted and suitable for operation up to 20,000 feet altitude, and the second will be designed specifically to operate in rarified air which is encountered at altitudes above 20,000 feet.

The Resistance to Movement is Greatly Reduced at High Altitudes.—The revolutionary German long distance super-gun, which is reported as firing a projectile 60 to 70 miles, accomplishes this result by firing at a high angle, so that the trajectory is a hyperbole, whose zenith is in the neighborhood of over 15 miles above the sea level. The density of the air above 50,000 feet is sensibly constant up to 200,000 feet and the absolute pressure is in the neighborhood of 1.4 pounds per square inch.

Hence the density of this air is reduced to about one-tenth of the atmospheric pressure at the sea level. The resistance to movement in this highly rarified air is greatly reduced. As a consequence, the possible velocity of the projectile is immensely increased over that of a projectile fired on a flat trajectory.

The same would be true in aeroplanes, provided the power did not decrease as a function of the density of the air. As an actual matter of fact, the speed of aeroplanes, instead of increasing with increasing altitudes where the resistances met with are reduced, they decrease in power and speed because of a lack of oxygen available for combustion to provide the motive forces.—*Flying, May.*



HOW FIGHTING AIR PATROL LINES UP.

The V-formation, with the camera machine in front and below, the five protecting planes above and behind it.

—*Baltimore Evening Sun, 25/4.*

THE DELICATE NAVIGATING INSTRUMENTS USED BY AVIATORS AND HOW THEY ARE BEING SUPPLIED TO THE SIGNAL CORPS.—The Signal Corps authorizes the following:

Before an airplane can be put into military service it must be equipped with nine or more delicate aeronautic instruments, some of which are absolutely essential to exact flying, and all of which contribute to the successful operation of a plane. Without them a pilot would soon lose his location as to height and direction; he would not know his speed through the air, the speed of his propeller, the amount of gasoline in his tank, the temperature of his cooling water, or if his oil was circulating. He could not tell whether he was banking properly on his turns. These comprise the necessary flying instruments, but an aviator could not fly to any great height without another valuable instrument, an oxygen-supplying apparatus, nor could he operate his guns, signal headquarters, release his bombs, or "shoot" his cameras without additional mechanisms.

Two Sets Sometimes Necessary.—All these instruments must be ready for installation on the airplanes as soon as they are assembled, for no plane is complete without them. In some instances, particularly for the two seaters and the heavy bombing machines, two and even three instruments of each sort are necessary, totaling sometimes as many as 23, but for ordinary work only about 9 of them are needed. The average cost of a set of navigation instruments for a single plane is \$350.

For operation of actual combat planes, such as observing, photographing, bombing, and fighting planes, many other complicated and expensive instruments and sets of apparatus are necessary. Among them are machine guns, gun mounts, synchronizers, bomb racks, bomb-dropping devices, bomb sights, radio, photographic, and oxygen apparatus, electrically-heated clothing, lights and flares. The cost of such additional accessories would bring the total cost of equipment for a plane to several thousand dollars each, depending upon the type of plane. But these devices will not be discussed in detail here.

One Purchasing Center.—The Signal Corps is purchasing practically all the purely navigating instruments and selling them at cost to the manufacturers of the airplanes as they are needed to meet the actual output of planes. This provides one purchasing center and prevents the various airplane companies and the government from competing against one another, creating disorder and confusion among the instrument manufacturers. At the same time it enables the Signal Corps to keep the supply of instruments adequate for the demands of the airplane builders, relieving them from this work, and it also affords standard equipment and interchangeability.

Foreign Models Improved Upon.—When the American air program began to be developed, none of the instruments now so vital to the service was being produced in quantities, and some of them were not being produced at all. Over 60 per cent of these instruments had to be developed from foreign models, and the remaining 40 per cent was secured by modifying or remodeling American automobile-type instruments. Numerous and serious difficulties were encountered in designing instruments, capable of quantity production, of the lightest possible weight and under exacting requirements as to accuracy. During this pioneer work, new instruments were being developed abroad almost daily, each new design carrying an improvement.

Most of the work in this connection was done by the Signal Corps in conjunction with manufacturers. All available information and data were collected, foreign and domestic models and types were carefully tested, designs were standardized, and specifications prepared. Results show that types for every class of instruments have been adopted and put into production here. Far greater standardization has been reached than exists in Europe to-day, tending to increase quantity production materially and decrease the number of replacement parts necessary.

New Sources of Supply.—Quantity production on the scale necessary demanded the enlargement of all existing sources of supply and the creation of many new plants and factories. A certain amount of time was available before it was necessary to use these instruments on planes in service—the planes themselves had to be built. Accordingly, orders were placed from three to eight months ahead of requirements, but only in such quantities as would insure a steady production, owing to the certainty of improvements in the various designs.

The early plans of the production department have developed from two to five sources for each instrument, established both as a safety measure and as a means of placing future orders on a strictly competitive basis.

Some of the Instruments.—Various instruments developed by the Signal Corps include:

The *tachometer*, or revolution counter, is an instrument which indicates the number of revolutions per minute at which the engine is running. Unlike the speedometer on an automobile, it does not translate revolutions into miles per hour; another instrument gives the speed in relation to the air. When instrument matters were taken up last July there were no tachometers manufactured in this country of the type which has proven most successful abroad; namely, the escapement or chromatic type. Two large manufacturing companies are now turning out these instruments in large quantities, one of them 100 a day, and a third company has also in production a new centrifugal type.

The *Air Speed Indicator*.—The *air speed indicator* is a pressure gauge for showing the speed of the plane in relation to the air, not the earth. This instrument includes what is known as a Venturi-Pitot tube, which is fastened to a strut and takes in the air from ahead. The air sets up a corresponding pressure in an auxiliary tube, which is calibrated and indicated on a dashboard recording pressure gauge.

The altimeter is an aneroid barometer, graduated to read height above the earth instead of pressure. Under standard specifications a reduction in weight and size was effected in the manufacture of these instruments, which are now being produced in large quantities and of a quality equal to the best foreign make. Three standard types are made, with ranges of 20,000, 25,000 and 30,000 feet. Production was up to 500 a week in April.

The *Aeroplane Compass*.—The airplane compass.—After much experimental work, this instrument has not yet reached the perfection desired. A new type, having advantages over any present form of compass, especially as to compactness, is now used. In the development of this instrument, effort has been made to reduce the weight to the safest possible minimum and to decrease the space required in the airplane. One concern is now turning out compasses at the rate of 200 a week.

Airplane clocks.—Due to the development which had been made in clocks for automobiles, it was only necessary to standardize a design of mounting in order to adopt such clocks to airplanes. Sufficient quantities are now available for all needs.

Pressure gauges.—Instrument-board pressure gauges were already manufactured here in large quantities, and as soon as standard specifications were developed, production started. Two types are used, one to register the air pressure which forces the gasoline to the engine and the other to show the pressure produced in the oiling system by the oil-circulating pump. Standard forms of cases and dials with interchangeable glasses and bezels have been designed.

The *Radiator Thermometer*.—Radiator thermometer.—This instrument is mounted on the instrument board, where it indicates the temperature of the cooling water in the engine. Undue heating shows that the engine is not running properly or that more water is needed. Thermometers of this type made here were, and still are, being submitted to extensive tests. Efforts were also made to stimulate the trade toward developing more

accurate and reliable instruments, and now a sufficient supply is available from two sources.

Banking indicator.—This is an instrument used to show when a plane is correctly banked in making a turn. Spirit level, balance, and gyroscopic types are being used. The problem of indicating the extent to which a plane is inclined to the horizontal in the air is a very complicated one. No simple solution has yet been reached. Fortunately, it is not often necessary to determine whether the plane is exactly horizontal, except in connection with bomb dropping. Development work is under way which it is hoped will lead to improvement of devices already in use abroad.

Aldis sight.—This sight, which is used in connection with fixed guns firing through the propeller, has been copied, as regards its optical features, from an English instrument; but the construction has been modified in such a way that the behavior of the instrument in actual use will probably be very much improved. After a number of tests and experiments satisfactory instruments are now available. The makers have been assisted in recomputing the lenses to suit the optical glass available in this country. The illumination of these sights for night operation is also being studied.

Standardization of Parts.—Standardization in connection with the design of the above instruments has been found possible, without delaying production to a much greater extent than has been done abroad. In this way the number of necessary replacement of parts has been considerably reduced, and a uniform type of dial has been adopted which, as to legibility, will be equal to the best that has so far been used. All finished instruments are carefully tested before being mounted on the planes.

Among other things, safety belts for pilots, observers and gunners have been designed and are now in production; radio and photographic apparatus, ordnance devices and oxygen apparatus have also been developed and put in course of manufacture.—*Official Bulletin*, 7/5.

UNDERGROUND HANGARS OF THE GERMAN AIRMEN.—These are unhappy days for the German flying men. Not only are they confronted by overwhelming numbers when they take to the higher altitudes, but even when resting in their shelters many miles from the battle front they are subjected to the attacks of enemy airmen.

Almost four years of continuous warfare has disclosed the fact that the German is not slow to put new ideas into execution. So it is not surprising to hear that the German airmen have resorted to the same device as their brothers in the first-line trenches, namely, underground shelters and hangars as a protection against hostile attacks. It is learned from allied intelligence officers that at many points on the western front the enemy is busily engaged in building underground hangars and quarters. And this, after all, is nothing more than carrying out their program of wonderful subterranean shelters on a far greater scale than heretofore attempted by the infantry.

It appears that the Germans are excavating roomy caves below the surface, which they roof over with a heavy layer of sandbags and the original sod. The roof is supported by pillars at frequent intervals, so arranged as to interfere the least possible with the movement of the airplanes. From the entrance of the underground hangar there extends to the surface an inclined runway of concrete, which can be used most admirably in starting a flight; indeed, no matter what may be the condition of the surrounding terrain due to rain or snow, the concrete runway is always ready for service. As likely as not the Germans are using or will use large strips of canvas painted the same color as the surrounding grass, to camouflage the concrete runway and the entrance to the hangar. While speaking of camouflage, it is also well to mention that they intend using decoy or dummy aerodromes some distance away from the underground hangars in order to draw off enemy attacks from the real objective.

It would be a case of sheer ignorance to deride this latest German idea, for in many respects it has marked advantages, particularly from the German point of view when the allied aviators are nightly attacking the German airmen at their camps. Furthermore, it is not infrequent for a severe wind storm to cause considerable damage to the usual aerodrome. Obviously, an underground hangar, if properly built and waterproofed so as to avoid excessive dampness which would certainly prove most harmful to the airplanes and other equipment, ought to be one solution of the housing problem.—*Scientific American*, 4/5.

MERCHANT MARINE

CONCRETE SHIP "FAITH" HAS TRIAL.—The 7900-ton steamer *Faith*, the largest concrete ship in the world, built by the San Francisco Shipbuilding Company, had a successful trial trip last week, averaging more than 11 knots an hour in its four trips over the official trail course. The *Faith's* engines were installed in 44 days, it being a local record. The success of the trip will result in the construction of three more concrete boats, each larger than the *Faith*, at Redwood City by the same company.—*Nautical Gazette*, 11/5.

ELECTRICITY TO RUN SHIP.—*Biggest Vessel of Its Kind in the World Has Just Been Built in England*.—London, May 6.—The biggest electrically-propelled ship in the world has just been built in England. It will be operated like a street car and will have 10 per cent more cargo space than a coal fuel ship of the same tonnage.—*The Star*, 6/5.

CONTRACTS TO BUILD 5 NON-SINKABLE SHIPS.—The Foundation Company of this city, through Franklin Remington, its president, announced yesterday that it has received from an unnamed government the contract for the construction of five steel ships of a new and supposedly non-sinkable type. The vessels are to be constructed within a year at a site near New Orleans just acquired by the company and now in the process of transformation as a shipyard.

"Naval architects in this country and abroad have worked out hundreds of designs for so-called non-sinkable ships, but few, if any, have been developed beyond the theoretical stage," said Mr. Remington. "In this case, however, an experimental boat was built and tested with results so satisfactory that the government interested has authorized the building of five vessels of this type. They will be of 42,000 tons dead weight and will have oil-burning engines."

These vessels, it is asserted, will be virtually submarine-proof. Tests of an experimental ship combining identical features have led naval architects to the belief that the new type of vessel will do all that was claimed for it, the company officials say.

The hull consists of two parallel cylinder shells joined throughout their length by a series of heavy-braced diaphragms. The ability to resist submarine attack, it is said, depends upon the improbability of the vessel being struck by torpedoes on both sides. Each cylindrical shell is not only divided into water-tight compartments by transverse bulkheads, but entirely isolated both from the adjoining shell and from the sealed space between the two. The latter space, it was explained, has a water-tight bottom and deck and is not used for cargo, but is provided solely for reserve buoyancy.

Claim is made for the new type by the Foundation Company that the proportions of the ship are such that it will not sink even though all the compartments on one side are flooded. An added advantage, the statement says, is that the vessels ride so low in the water that their visibility is reduced and they do not furnish a fair target for gun-fire.

Another new feature of the "non-sinkable" vessels is that they are equipped with separate unit engines, and in case one set is put out of use, the other set can carry the disabled craft to port.

Defence guns will be mounted above the fore and aft deck houses. These latter will be the quarters of the crew and will be connected, for safety in rough weather, by way of the reserve buoyancy space.

It is expected that the first of the five vessels will be launched early next year, and the first completed vessel will be ready for her maiden trip across the Atlantic in April, 1919.

The American patents for this type of ship are controlled by a New York firm of engineers, of which Joseph Boero is president. It was through this firm that the Foundation Company obtained a contract for the first steamers to be built. This is the third order which the Foundation Company has received from the government in question, and brings the number of ships under contract up to 83. In addition to this, the Foundation Company is building vessels for the United States and for other allied governments.—*N. Y. Times*, 28/4.

THE DIESEL ENGINE-DRIVEN CARGO VESSEL.—Calling attention to the progress which is being made in the development of the internal combustion engine of low power for fitting in auxiliary vessels, *Shipbuilding and Shipping Record* remarks that, despite the undoubted economy possessed by these vessels, British shipbuilders and shipowners have a deep-rooted preference for the cargo vessel without sails. It is necessary now to consider why it is that the internal-combustion engine of moderate power is not yet considered a suitable machine for the propelling of cargo vessels of moderate size and power. These vessels form the bulk of our merchant fleet, and it can be asserted that if a thoroughly reliable Diesel engine of about 2000 horsepower could be designed, such as would propel a vessel of 300-foot length at a speed of about 11 knots, the demand for such an engine would be very great indeed. Two main objections have been advanced against the adoption of this type of engine; first, that it is dependent upon the supply of a fuel which comes from abroad, and, secondly, that the Diesel engine has not yet reached the same state of reliability as the reciprocating steam engine of the same power. The chief objection is undoubtedly the latter. There are many services in the course of which vessels could obtain adequate supplies of fuel oil at very cheap rates, and yet vessels for these services are still built which are propelled by steam engines, although oil fuel boilers are often employed. When it is remembered that the employment of the same oil in a Diesel engine would result in an approximate halving of the fuel bill, the advantage of adopting this type of engine is apparent, always provided that an equally reliable engine can be obtained. The United States Shipping Board is constructing a number of standard oil tankers, and yet these vessels are all propelled by steam engines. It would appear, therefore, that the main problem is one of designing a reliable type of internal-combustion engine.

The war must be held responsible in a very large measure for retarding the progress of the Diesel engine, especially as far as the British-built engine is concerned. There have been a few of the well-known continental firms who have built a special type of Diesel engines, such as Burmeister and Wain, Sulzer Bros., and Schneider, and there have been British engineering firms who have taken up the construction of Diesel engines of the pattern produced by one or other of these continental firms, introducing, perhaps, improvements of their own, but we still await greater initiative on the part of British engineers to design particular types of oil engines of their own. Of the engines built in this country, little working data are available. They all, of course, showed the great economy of fuel consumption which makes the Diesel engine so efficient a form of prime mover, and thereby compels designers to continue to attack the problem of the production of engines of this type, but from the point of view

of reliability, freedom from breakdown, and cost of construction, maintenance and repairs, they all left very much to be desired. Doubtless improvements are being made which tend to increase the reliability of these engines, and but for the war a far greater amount of attention would have been given to the problem so that progress would doubtless have been more rapid than it has actually been.—*Nautical Gazette*, 2/5.

STANDARD SHIP DESIGN.—*Owners' Comments on a New Type*.—(From our Shipping Correspondent.)—It seems likely that shipowners may press for a little more information respecting the "N" type of fabricated standard ship which was recently described by the First Lord in the House of Commons. This particular type, the First Lord explained, was "designed by the Admiralty in the Department of the Director of Naval Construction in close consultation with the Department of the Controller" and, giving some details, he said: "Comparing this type with the type 'A,' which was the original design, we get 2470 tons additional deadweight capacity for an extra 11½ feet in length. Each ton of net steel in the new type will yield 4.06 deadweight tons, against 3.53 tons for each ton of net steel in the original type, an increase of carrying capacity of 15 per cent for each ton of steel. Not, I think, a bad result for these experts branded as amateurs!"

Owners quite recognize that, without adding much to the length of a ship but by increasing the beam and depth, the deadweight-carrying capacity could be raised. But they point to the existence of a danger that such a vessel would not have space for the stowage of sufficient ordinary cargo to put her down to her marks—*i. e.*, to enable her to carry her full weight. Alternatively, it is argued that if a cargo of sufficient density were found to enable the ship to carry her full deadweight, then the question of her suitability for heavy weather would arise. The theoretical gain in the carrying capacity of such a vessel would, they maintain, in practice be likely to be lost.

While owners will gladly give full credit to any ingenuity which is proved to be effective in stimulating the rapid production of tonnage, it is not unnatural that they should view somewhat critically departures from established and successful forms of design. It is they who, together with the shipbuilders of the country, were responsible for maintaining the supremacy of the British mercantile marine before the war, and they would be loth to accept any suggestion that they did not select the most suitable forms of design. Further, it is pointed out that the "A" class of standard ship, with which the "N" type is compared, was the result of "deliberations of high shipping and shipbuilding authorities."—*London Times*, 15/4.

WORLD'S SPEED RECORD MADE IN BUILDING STEEL COLLIER.—*New York Company Completes 5500-Ton Steamship in 27 Days*.—The United States Shipping Board authorizes the following:

The steel collier *Tuckahoe* was launched from the Camden ways of the New York Shipbuilding Co. at 10.30 o'clock Sunday forenoon, thereby establishing a world's record in rapid ship construction.

The record was 27 days, 2 hours, and 50 minutes. This means that within that period a 5550-ton steel steamship was built from keel to truck and launched practically complete in every detail—boilers in place, engines installed, masts stepped, funnel in place, propeller fitted, rudder hung, and only finishing touches to be put on.

Forty-one Days Ahead of Time.—The *Tuckahoe* was to have been delivered on June 15. The company, therefore, got her out 41 days ahead of time.

The vessel has a length of 330 feet, a beam of 50 feet, and will be endowed with a speed of 10½ knots.

This accomplishment of building a steel steamship of this bulk in a fraction more than 27 days is one of the marvels of the day. It surpasses

any record hitherto made in any shipyard of the world. The best record of any British shipyard is said to be about two and a half months. Previous to our entrance into the war American shipyards had not outstripped British competitors in the rapid construction of merchant tonnage.

The *Tuckahoe* was christened by Miss Helen Hurley, the young daughter of the chairman of the shipping board.

Chairman Hurley, who made a congratulatory address to the shipbuilders, read the following letter from President Wilson:

The President's Letter.—The White House, Washington, May 3, 1918. To the Workmen and Executive Staff of the New York Shipbuilding Company, Camden, N. J.: My Dear Friends: I want to congratulate you on the extraordinary record you have made in your work on the steamship *Tuckahoe*. I wish I could be present in person to express to you the feeling that I have that we are all comrades in a great enterprise and that you have played your part with extraordinary devotion and skill, eliciting not only my admiration, but I am sure the admiration of all who will learn of what you have accomplished. I congratulate you and bid you Godspeed.

Cordially and sincerely yours,

WOODROW WILSON.

—*Official Bulletin*, 6/5.

WHAT DO YOU MEAN BY "A MILLION TONS OF SHIPPING?"—Recently the Germans announced that in a certain period they had destroyed a million tons of British shipping. London countered with the reply that the actual tonnage was less than 500,000.

Yet both statements were true, and, indeed, they were identical, save that they refer to different kinds of tons.

Let us examine this matter of tonnage calculation and endeavor to present the facts so that a layman will readily understand the figures. What the average American wants to know is how many tons of supplies a vessel will deliver in Europe, and we cannot recall that we have ever seen an official statement which calculated in that simple sort of unit.

When we hear the word "ton" we are inclined to think of 2000 pounds. Alas, before we can understand this subject we must rid ourselves of the simple arithmetical rules of childhood and face the fact that there are at least four utterly different meanings to the word "ton" as used in the shipping trade, and that while in two of these cases the word refers to a matter of weight, in the other two it relates to a measurement in cubic feet and has no concern whatever with weight. Finally, you must know that even after you understand the four meanings of "ton," that doesn't greatly help you to find out how much cargo a vessel will carry.

There is an obvious reason for using one system of measurement for fighting ships and another for cargo vessels. In the latter case we want to know how much freight can be carried, while in the former there is no such thing as freight.

Therefore, naval vessels are usually measured by "displacement." When we say, for example, that the dreadnought *New York* is of 27,000 tons, we mean simply that she *weighs* 27,000 tons. And since she "displaces" water equal to her own weight, we are accustomed to say that she has a displacement of 27,000 tons.

When we come to merchant vessels, the complications begin. First we say, for example, that the shipping board hopes to turn out in 1918 vessels of 6,000,000 *deadweight* tons. What this really means is that if we should take all these vessels at one time, absolutely new and empty, and if we should put on board their crews, fuel, the consumable stores, and supplies of all sorts, and should then put cargo on board them until they were carrying the maximum amount with which they could safely go to sea, then the weight of all these various things, from crews to cargo inclusive, carried by these ships would be 6,000,000 tons. The *total* deadweight

(and liveweight) they will safely hold is 6,000,000 tons. Obviously this does not mean that these ships can take 6,000,000 tons of cargo.

The British Government gives out a weekly statement that so many tons have been destroyed by submarines. These are *gross* tons, and have no relation whatever to weight. To understand what a "gross" ton is, one must realize the reason for this sort of measurement. You are interested in knowing how many tons a ship will carry. Now, clearly, she will carry more tons of iron than she will of loosely-packed feathers. In other words, the bulk of the freight—its cubic content—has something to do with the quantity the ship will carry. So it became usual to calculate the bulk of various packages of freight, and then to measure the inside of the ship and so find out how many of such packages she would carry. It would have been simpler if we had just measured the vessel and said that she would hold a bulk of so many hundred cubic feet. But we didn't. We took the over-worked word "ton" and said: "We won't use the expression 'one hundred cubic feet,' but 'one ton,' and we will mean exactly the same thing."

Now, ridding ourselves, for the sake of simplicity, of certain arbitrary legal rules as to how you shall measure and between what points, it is correct to say that when we speak of *gross* tons we are referring to the inside measurements of the cubic volume of the ship. For example, the ordinary office room or living room contains about 3000 cubic feet of air. It has, therefore, in the language of the merchant service, a measurement of 30 *gross* tons. If we take the ship, new, and with her deck houses and enclosed spaces complete, and if we measure her on the inside and find that she holds 1,000,000 cubic feet of air, then we say she is of 10,000 times 100 cubic feet internal volume, or that she is of 10,000 *gross* tons.

This is also equivalent to saying that if we have a cargo of wool or hemp in bales, or starch in cases, of which 100 cubic feet will weigh a ton, then we could stow in that ship 10,000 tons of this cargo, provided we made no provision for engine or boilers or living spaces. That is, her *gross* capacity for such freight would be 10,000 tons, or she is of 10,000 tons *gross*.

But this is so theoretical that it brings up the necessity for still another sort of ton. Clearly we must allow space for the engines, crew, etc. Let us suppose that we find that these necessary spaces take up one-third of the ship and that two-thirds of the room are left for cargo. Then into this *net* space, this two-thirds, we can put two-thirds of 10,000 tons, or 6666 tons, of our hypothetical cargo. So we say the vessel is of 6666 *net* tons.

But there is another complication, for freight charges for such a cargo are based on tons of only 40 cubic feet!

Now, perhaps, we are better able to discuss the practical question, "How many tons of average, mixed, miscellaneous supplies will a given ship carry over and deliver to Europe in a year?"

This depends on how many trips she will make, consequently on her speed and on the wharfage facilities which give her quick or slow discharge. It depends on whether she is somewhat like the *Vaterland*—now the *Leviathan*—built for passenger and not for freight traffic. It depends on how much cargo space she must give up in order to carry enough coal for the voyage; if she is to make the trip at 20 knots she will require about eight times as much coal as if she is to do it at 10 knots. Allowing, however, in a fair, practical way for all these factors, and remembering that nowadays the vessel must take enough coal for the entire round trip and that she must zigzag and run fast in the danger zone, we believe that if from the average vessels now at the disposal of the government we take enough ships to represent one million *deadweight* tons, these same vessels will measure 667,000 *gross* tons, or 500,000 *net* tons.

Such vessels would carry on a single voyage about 450,000 tons of government supplies. In view of present terminal conditions, they would

make about five trips per year and deliver a total of 2,250,000 tons of freight.

Let us apply these figures to a single ship of, say, 7500 tons deadweight, which is about the average size of the steel ships now building under the shipping board. Then as to such a vessel the probable statistics are these:

She is of 7500 *deadweight* tons; take two-thirds of this and we may say she is of 5000 tons *gross*; again take two-thirds and she is of about 3750 tons net register; she will carry about 3500 tons of general cargo per voyage, will make about five round trips per year, and so deliver to our army about 17,500 tons of supplies per annum.—*Sea Power*, May.

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GREAT BRITAIN

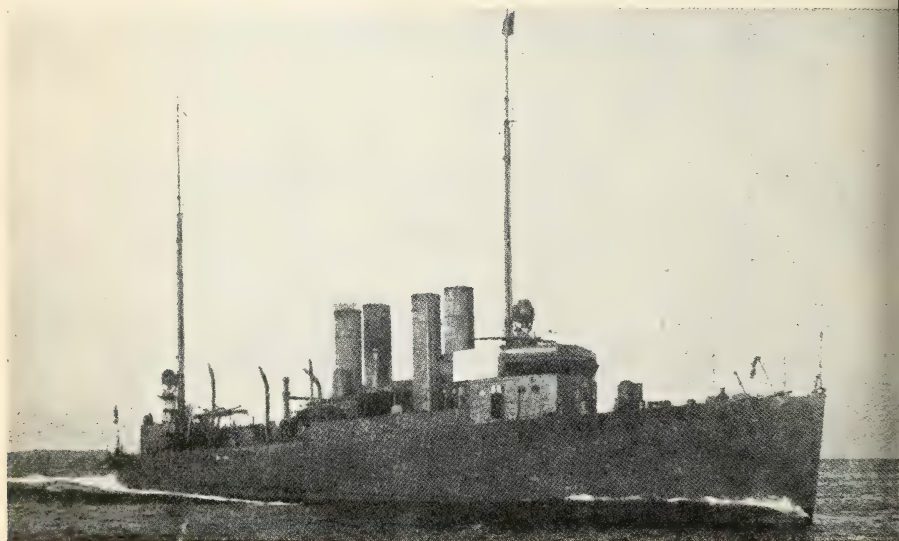
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DESTROYER "MANLEY" BADLY INJURED IN COLLISION.

The destroyer *Manley*, one of the recent types of the U. S. Navy, was badly damaged and her commanding officer and a number of enlisted men were killed, when she collided with a British warship abroad. A depth bomb exploding did the greatest part of the damage. (Photo by International Film Service.)

INTERNATIONAL NOTES

1. NAVAL WAR NOTES.....
2. DIPLOMATIC NOTES

NAVAL WAR NOTES

PREPARED BY

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STRATEGY

CAN OUR HEAVY SHIPS GO TO EUROPE?—The sending of more American warships to the other side, particularly if they have to be capital ships and if their station is to be the Mediterranean, brings us face to face with a serious problem.

Fighting ships, operating in distant waters, require the support of auxiliary vessels, a train of supply ships, ammunition carriers and colliers. The necessity for these auxiliaries and the situation of the United States Navy with regard to them was stated by Admiral William S. Benson, Chief of Naval Operations, to the Committee on Merchant Marine on March 9, 1916, as follows:

"In time of war, or preparation for war, it would be necessary for us to very largely increase the number of our auxiliaries in order to carry fuel, supplies, and, under certain conditions, a certain number of men. . . . Should it be necessary for us to conduct a campaign across either one of the oceans. . . . it would be necessary to have a considerable number of fuel ships, not only to accompany the fleet, but many to be going back and forth from the source of supply.

Half a Million Tons Short.—"At present we have 24 fuel ships, and we are asking for a few more. . . . We have 12 of the larger ones carrying from 7500 to 12,500 tons, and then we have a number (six or eight) of the smaller type of colliers that were bought at the outbreak of the Spanish-American War, but which are very small and rapidly reaching the stage where it does not pay to repair them. It is hardly economical to run them, because they carry so little coal. And then, of course, we hope in case of war to be able to draw on the Panama Canal colliers and fuel

ships. But even with all of those we find that at present we are short a certain amount, some four or five hundred thousand tons, of what we would need in time of war or proper preparation for it."

Our Navy's Needs.—In a letter to the Secretary of the Treasury dated July 27, 1915, Admiral Benson gave the requirements of the navy as to colliers as follows:

"Fleet colliers.—Number required, 4. Characteristics: Speed, at least 12 knots; steaming radius, 6000 to 8000 miles; gross tonnage, not less than 5000 tons (equivalent to about 7500 dead-weight tons).

"Service colliers.—Number required, at least 200. Characteristics: Speed, at least 8 knots; gross tonnage, not less than 3000 tons (equivalent to about 4500 dead-weight tons)."

The fleet colliers accompany the fleet and are built to coal battleships at sea. The service colliers would carry coal from the United States to the American naval base in Europe. Without this service an American battleship fleet in European waters would have to depend upon British coal—and the present shortage of coal in England and all the entente countries of Europe is a serious war problem.

Such was the situation in July, 1915. In March, 1916, Admiral Benson stated that "the conditions are just the same, practically."

The navy sought an appropriation for the construction of the four fleet colliers, Admiral Benson says, in 1916, but the naval appropriation bill of that year, making appropriations for the fiscal year ended June 30, 1917, did not carry such an item. The colliers were not provided for until Congress began the enactment of war emergency legislation. In his testimony before the House committee, Admiral Benson said, in response to inquiries as to the length of time it would take to build such vessels:

"Approximately six months would be required to prepare plans and place the orders for the material required for vessels of a new design. It would, therefore, require about two years to produce the first ships, and six such vessels could be constructed simultaneously during that time. . . . After two years ships could continue to be produced at the rate of about seven a year, provided they were reproductions of those already built."

We Face a Serious Situation.—Undoubtedly, the situation with regard to colliers and auxiliaries in our navy is more serious than any other phase of our naval problem. The above review of the Russian situation shows clearly enough the likelihood that exists of an urgent necessity developing for the sending of more American warships to the other side. Altogether apart from that situation, however, there are many naval experts who believe that the whole American naval strength should be concentrated in the war zone." In any event the need for colliers and auxiliaries is obvious.

Naval preparedness, no matter how excellent it may seem on the surface, can be rendered useless by weakness in one element, and it is idle to attempt, in this war, to make things look better than they are. There is no desire to be unduly pessimistic, but it is high time that attention was given this situation and especially that steps be taken to supply and maintain the whole American naval force "over there."—*Sea Power*, May.

THE CHANNEL STRAITS.—By A. H. Pollen.—The following question has been put to me: "I observe that, in the current number of *Land and Water*, your colleague, Mr. Belloc, in explaining the enemy's selection of the Messines-Givenchy sector for his recent attack, points out that, among the arguments in its favor, 'for what it is worth there was the moral effect of an attack developing close to, and threatening that highly sensitive point, the straits of the Channel.' Is it not possible that he had something more than 'moral effect' in view?"

"I am driven to ask this question: Is it possible the enemy has some objective, altogether independent of the direct military advantages of his procedure? Is he, in other words, trying to maneuver us into giving up Dunkirk, and then, possibly, Calais? If there were some overwhelming

naval advantage to be gained by the possession of Dunkirk, his policy might seem to be justified. Is it possible to state, with some precision, the change that would be brought about in the naval position if the enemy were either at Dunkirk, or at Dunkirk and at Calais?"

In essaying to answer this question, I shall not attempt to assess either the probability of or the military effect of our withdrawal from Dunkirk, or of our being compelled to give Calais to the enemy. Though the first seems to me highly improbable, and the second altogether out of the question, all I am concerned with here is to deal with the effect their tenure by the enemy would have in assisting his naval operations in impeding ours, and in giving him means, other than naval, for interfering with our sea traffic. Before attempting a reasoned answer, it might be as well to glance at what may be called our traditional policy with regard to the Dutch, Flemish and French Channel ports; for it is really to this tradition, and not to the facts of the situation of to-day, that we must look for the moral effect of which my colleague wrote last week. From very early times it has been taken for granted that the possession of these ports by an enemy must constitute a serious sea menace. It is largely for this reason that, ever since the fall of Napoleon, the maintenance of the independence and neutrality both of Holland and of Belgium has been a corner stone of our foreign policy. When, therefore, in September and October, 1914, the enemy, having seized Ostend and Zeebrugge, was engaged in a determined effort to get Dunkirk and Calais as well, the utmost uneasiness was created in this country. But I do not think many people could have stated explicitly their exact ground for uneasiness in the sense of being able to say precisely what particular naval and military operations the possession of these ports would have made possible for the enemy. People forgot that our historic attitude in this matter dated from the period when there were not only no submarines, but no 30-knot destroyers, nor guns with the modern command of range, nor air power. Consequently, if it was traditional policy with us that the Dutch ports, the Flemish ports and the French ports should be in separate possession, and two of the groups neutral, it seemed necessarily to follow that, if an enemy could get two groups into his own possession, not must an immediate blow have been struck at our prestige, but some kind of naval loss of a serious kind would follow. Calais and Dunkirk, then, grew into symbols just as Verdun did later on. To possess them became an end in itself, and hence their denial to the enemy became of crucial importance.

As a simple matter of fact, the actual possession of Dunkirk, or even of Calais—viewing the thing altogether apart from the military consequences involved—would affect the naval position adversely at a single point only. And the explanation of this is not very recondite. The two governing factors at sea are, first, that the enemy's only free naval force is his submarine fleet, which is almost independent of port facilities, and, secondly, that outside the immediate vicinity of his larger ports, the enemy possesses no freedom of surface movement at sea at all. If you examine these propositions separately, their truth becomes obvious. The two main and most profitable fields of the enemy's submarines have been from the Chops of the Channel westward, and in the Mediterranean *passim*. To be a thousand miles from its base makes, therefore, very little difference to the submarine. To give a submarine-using enemy a base a few miles nearer his main field would consequently confer no advantage on him of any kind whatever.

Curiously enough, if we suppose the Channel to be the field of their operations, the same thing is true about the enemy's surface craft, though for a very different reason. For, as things stand to-day—and as they would stand if he got Dunkirk, Calais, and even Boulogne—his freedom to get his destroyers or other ships out of harbor can be exactly measured by the distance he is from the nearest British base. The truth of this was instructively shown last week. Twice in the course of a few days

we heard that our ships had swept into the Kattegat and the North Sea, each time destroying German trawlers on outpost duty, and capturing their crews. On two other occasions unsuccessful efforts were made to cut off destroyers that had been bombarding parts of the Belgian coast, west of Neuport. On each of these the enemy escaped in the darkness. The point of the contrast lies in this. When he is four or five hundred miles away from a British base, the enemy can venture out by daylight, so long as he does not go so far afield that he may be cut off and brought to action before dark. If no British force appears in such distant waters for some days together, he may even venture to send out light craft, such as trawlers, either to lay mines or to sweep for them, or to engage on some other operation. But even here he risks their destruction if he does so. But from Zeebrugge, which is less than 80 miles from Dover, he dare not venture out at all except by night. You never hear of German trawlers being raided off Ostend by Admiral Keyes' command. And, whenever there is news of an engagement, it is either a midnight or a mid-fog affair.

Zeebrugge and Ostend.—Zeebrugge and Ostend, then, are, on the experience of the last three years, perfectly useless to him for any daylight work. They are just jumping-off places for night raids, and refuges into which the marauders must rush for safety at the first threat of attack. Observe that never yet has the enemy in such encounters even pretended to fight the engagement to a finish. He runs—as he did the other day—though he had a force of eighteen boats against a bare half-dozen. He cannot, from the nature of the situation, even risk delay. He must always fear a still stronger force coming on the scene. Hence, they are not bases from which systematic naval operations could be carried out, nor any orderly form of sea-pressure be put upon us by regular and methodical operations. The fact, then, that we control the surface of the sea robs Dunkirk, Calais and Boulogne of any surface-craft value to the enemy, just because they are so much nearer to our main base at Dover than are Zeebrugge and Ostend. Indeed, we can go further. If he hardly now dares come out of Zeebrugge, it is doubtful if he would run and go into Dunkirk or Calais. Neither can help him then with his destroyers. And, because submarines do not require bases into which to run for refuge, these ports are unnecessary to him for his submarine campaign.

I said just now that there was one respect in which the possession of this strip of French coast would be an advantage to the enemy. It is that the blocking of the Channel at its narrowest parts by mine barrages would be either impossible or exceedingly difficult. But the possession of Dunkirk only would hardly affect this, for from Dunkirk to Cape Gris Nez is nearly 40 miles; and our establishment and maintenance of a barrage would not be affected unless the enemy occupied not only Dunkirk, but the whole coast right round to Boulogne.

We may then, it seems to me, make our minds comparatively easy as to the effect on the naval situation of any further advances of the enemy along the French seaboard, so far, at least, as the naval situation can be affected by purely naval means. But are there not other than purely naval means that would affect, if not our naval forces, at any rate the sea traffic which it is one of the main objects of naval force to protect and guarantee? The enemy, we are told, has been bombarding Paris with unpleasant regularity from a range of 75 miles. From Dunkirk to the Downs is not more than half this distance. Every mile he can push on of the 25 that intervene between Dunkirk and Calais will very nearly reduce the range of the English coast by an equal amount. Would it still be safe for ships to come up Channel and enter the mouth of the Thames? Or would London cease to exist as a port, except for such traffic as could come to it north about? Far be it from me to suggest the limits of the enemy's ingenuity in designing, or of his industry in producing, cannon of fabulous reach. But the merest tyro in the art of gunnery would be able to reassure us on the value of this artillery as a menace to trading

shipping going up and down the Channel. If the enemy held the coast of France from Dunkirk to Cape Gris Nez, his guns could reach Shoreham on the Sussex coast and Orfordness in Suffolk; so that the whole of Kent, all of Surrey and Sussex that lie east of the main Brighton line would be under his fire. His limit of range would be just short of Croydon, from a point just opposite Erith to the south of a line through Chelmsford and Colchester. The lower corner of Suffolk, including Ipswich, would complete the danger area. The Thames, of course, would be under fire almost right up to the docks in London.

This may all sound very terrifying, but it would be entirely without naval significance, for the simple reason that at these extreme ranges no aiming with a gun is possible at all; and the value of guns of this kind, trained even on a great city like London or Paris, is not distinguishable from that of regularly conducted air raids. Indeed, as far as destruction of life is concerned, it is probable that the same number of air bombs—from the fact that their explosive charge is so much greater—would be far more deadly than the 9-inch shell, which the German long-range gun is supposed to carry. As to such guns, or even the much more accurate naval gun, being mounted on the coast to prevent the passage of merchant shipping, this menace is entirely chimerical. If the best naval ordnance in the world were perfectly mounted and controlled from Dover or Calais, shipping could, in broad daylight on a clear day, pass up mid-Channel with complete safety, if they adopted the simple precaution with which every merchant skipper is familiar, from his experience with submarines. He has only got to zigzag his course to make hitting impossible at 10 miles, and at 20 no accurate fire of any sort would be conceivable. We must, therefore, look for a purely military explanation of the enemy's present military policy.

The Submarine.—Most people, when they think about the submarine, imagine its unique merit to be its power of unseen attack. This, however, is not really the case. For nine out of ten submarine attacks have to be made with the submarine either altogether or at least partially visible. The unique character of the submarine is its power of invisible passage. It can, that is to say, set before itself a destination, and by coming to the surface only during darkness, travel in almost continuous invisibility until it has reached the desired point.

The development of under-water hearing makes it possible in some conditions to discover that a submarine is in the neighborhood. But under-water hearing cuts both ways, and for the moment it is doubtful if, in the open sea at least, the submarine has not gained most by its development. For, being able to lie motionless—and therefore soundless—on the bottom, it can, by periodically stopping to listen, decide whether at any moment it is safe to come to the surface or not. For practical purposes, therefore, the submarine, if it can avoid mines, can navigate the seas with comparative freedom from risk. Hence, though I have no definite information to guide me, I will hazard the guess that 95 per cent of the submarines that are destroyed are caught either when they are on or near the surface for purposes of attack, or just after diving from the surface, when the area within which depth charges will reach them can be judged with sufficient accuracy to make the counter-attack almost sure. It follows, then, that only such submarines are destroyed as are either surprised when their commanders think they are in safety, or intercepted when their commanders think they are taking a legitimate risk in coming up. Thus anti-submarine offensive depends for its efficacy almost entirely upon the greed of the submarine for its prey, just as the—very uncertain—success of the angler depends, as Sir William Simpson says, on the appetite “of a scaly but fastidious animal.”

When men fish for a living, they do not rely on anything so uncertain as the combination of skill and judgement of the angler with the appetite or voracity in the fish. They deal with the quarry not as a creature that can

be tempted to the surface, but as a resolute denizen of the depths, and proceed to intercept him between his starting-point and his designation by means from which, being invisible and submerged, he cannot escape. The professional fishermen, in other words, recognize that the under-water quarry, if it is to be attacked wholesale, must be attacked by under-water means. The application of this counsel to the case of the submarine has, from the first, been obvious enough. The arming of merchantmen and their convoy by gun- and depth-charge-carrying destroyers, the regular patrolling of infested areas to search for submarines while recharging their batteries on the surface at night, the employment of aeroplanes to discover them near the surface—all these things may be likened to the angling side of the fisherman's craft. It is no doubt the more attractive form of fishing. It appeals more to the artist and to the sportsman. But it is too accidental to be the method that gets satisfactory results in fish brought to market. For this, wider and, if you like, brutal ways are better. For obvious reasons, you cannot trawl for submarines, nor does it seem likely that stationary obstacles, whether nets or otherwise, would be effective—if merely designed to impose a passive barrier between the submarine and his destination. Through any such obstacles as these some means could certainly be found of using a torpedo to clear a passage. But it is not at all certain that the submarine could ever find a way of evading continuous mine-fields, spread from shore to shore over the Channel and North Sea, and repeated at different depths, so that at no level or even on the surface could a safe passage be found. It looks, then, as if the only wholesale method of dealing with the submarine is to make its passage through any tract of sea that it is bound to pass, if a destination is to be reached, wholly impossible.—*Land and Water*, 11/4.

TIME LOST ON CONVOY.—*Grouping of Vessels by Speed Suggested.*—It is well known that the introduction of the convoy system has proved a success in the safeguarding of merchant vessels, and it is equally well known that there is a serious loss of carrying capacity owing to the greater length of voyages at present, as compared with the time occupied before the war. Part of this loss is clearly inevitable in view of the precautions which are taken; but Liverpool owners are of the opinion that some of the loss is avoidable.

Liverpool owners are interesting themselves especially in the matter, because it is they chiefly who are concerned with the North Atlantic trade, and in a comparatively short-distance trade, such as this, the loss soon becomes apparent. Now one great drawback to the convoy system is that the speed of the fastest ship in a convoy has to be reduced to the speed of the slowest ship. Obviously, therefore, in order to obtain the advantage of the speed of the fastest ships the most economical system would be to group the vessels of about the same speed together.

It is claimed that by putting this system into practice the dead-weight carrying capacity of the existing ships in the North Atlantic trade could be increased by between 450,000 and 500,000 tons per annum. In arranging the grouping of the faster vessels, the British and United States Admiralties could rely on the thorough support and assistance of the great liner companies. Similar help would no doubt be forthcoming from the cargo companies. The criticism is made that there is at present not sufficiently close working respecting the formation of convoys between the Admiralty and the Ministry of Shipping. As an instance, the cases are cited of two vessels which were recently kept waiting 11 days in the Mersey for escorts, and of two which were kept waiting there for seven days.

The present need of cargo space is so urgent and the carrying capacity of the liners in the North Atlantic trade is so great, that it is particularly important that no time shall be unnecessarily wasted. Certain delays are, as already pointed out, inevitable, but owners believe that the loss due to the grouping of vessels of varying speeds is unnecessary. The first

step in the direction of avoiding this loss would seem to be for the Admiralty to consult with the managers of the liner companies. The owners realize that the last word on the subject of the management of convoys must be spoken by the naval authorities, but they believe that they can be of very great assistance, and they are anxious to do everything within their power to bring about a saving of carrying capacity.—*London Times*, 3/4.

LAST WORD WITH SEA POWER.—*A Vienna Comment*.—The Vienna *Arbeiter Zeitung* publishes the noteworthy admission that, whatever victories Germany may win ashore, the last trick is always in the hands of the masters of the seas. It says:

"Let no one deceive himself. Germany's victories may make the Entente more inclined to a peace by agreement, but by no victory can they be compelled to submit to a peace by compulsion. For even if the German sword should be able to achieve much more than it has yet done—if the Germans should storm Calais and march into Paris, and if the continuation of land warfare should become senseless and impossible, the English would still remain protected on their island and America by the Atlantic: they could still continue warfare by sea, and still cut off our supplies of raw materials and foodstuffs. The greatest victory on land cannot force upon England and America a peace by compulsion.

"Thus a peace is only possible if the German people refuses to allow itself to be intoxicated with victory."—*London Times*, 1/4.

A NEW GERMAN PORT.—By Arthur Pollen.—When Kerensky fell and the fortunes of Russia were confided to a government of fanatics and traitors, it became obvious that the military situation on the western front would suffer a change very damaging to us, as soon as the enemy troops, hitherto contained by our late ally in the East, could be transferred to the sole remaining field of war. What in the late autumn it was obvious must happen, has in the last three weeks actually happened. To what extent, if at all, is the naval position adversely changed by the elimination of Russia from the war?

Some weeks ago it was pointed out here that the most obvious of the naval advantages that Germany could gain by her advance on Petrograd would be the possession of so much of the Russian Baltic Fleet as was either in fighting condition or could be completed or refitted. If the battleships and battle-cruisers of the old program had been ready by their due dates, were in fighting trim, and were so surrendered, the enemy's reinforcements might be so formidable as to make it necessary for the Grand Fleet to be enlarged by all of the American 14 dreadnoughts. Nothing appeared in our press on this subject since that article was written until last week, when Reuter's correspondents at Stockholm and Petrograd informed us that the Germans had landed 40,000 men, 3000 guns, 2000 machine-guns and armored cars at Hango, and had already advanced to Ekenaes, 20 miles along the railway which, 70 miles further on, forms a junction with the line that leads down to Helsingfors. We learned also that at Helsingfors are moored two Russian battleships, a division of destroyers, five submarines, and numerous transports, and that these are ice-bound and cannot move, because the only ice-breaker had left Helsingfors and surrendered to the Germans at Revel, just before the landing at Hango took place. At Hango itself there were four submarines and several other Russian warships, and the commanders of these vessels, being unable to resist the landing, blew them up rather than that they should fall into the hands of the enemy.

The only satisfactory feature of this news is that some Russian warships are still under the command of men loyal enough to their country to prefer seeing their ships destroyed to seeing them tamely handed over to the enemy, not only of Russia, but of mankind. Whether the battleships

at Helsingfors are in such loyal hands we do not know. It would clearly be possible, by exploding small charges in the engine-rooms, the gun-mountings, in the guns themselves and in the ships' bottoms, to put the vessels beyond the possibility of repair, and to do so without risk of any kind to the surrounding population, supposing the ships to be moored where their complete destruction, by blowing up the magazines, would be a public danger. If they are not in such hands, the first accession of naval strength to the enemy will become an accomplished fact, and allied plans will have to be altered to meet them.

But, as has been foreseen from the first moment when the German expedition into Finland was announced, the enemy has a second naval objective in view which, if it succeeds, may prove far more embarrassing to us than any increase of his battleship, cruiser or destroyer strength. On Wednesday last week *The Times'* correspondent at Petrograd announced that Germany's Finnish allies were already advancing on Kem, a port on the North Sea, the most important town on the Murman Railway that connects Kola with Petrograd. This correspondent also hints that some allied effort is being made to prevent this railway falling into traitorous hands. If the possession of Kem were followed up by the effective occupation of Finland, not only would Petrograd be hemmed in from the North, but German access to an ice-free Arctic port would seemingly be secured, except for such opposition as a navy working with or without military assistance could oppose. The possession of this port would be of incalculable value to the enemy for various reasons.

The latest maps seem to give the name of Romanov na Murmanye to this latest Russian effort to get access to the sea, and it is situated halfway up an inlet known as Kola Bay, which is, in fact, the estuary of the River Tulom. It is situated about 75 miles from the Finnish and Norwegian boundary in the Varanger Fjord. Though nearly 10 degrees north of Archangel, it is not ice-bound in winter. It is not the lowness of temperature that makes Archangel useless in the winter months, but the fact that the southerly currents from the Arctic Ocean, combined with the prevailing winds, carry the ice floes southward into Dwina Bay, and there pack them in such masses that it is neither possible to prevent the channel being altogether blocked, nor to blast nor break a channel when the block has taken place. Kola Bay is free from both these phenomena, and though the surface may freeze, it seldom, if ever, attains the thickness that cannot easily be dealt with.

The advantages that a properly equipped port at this point would give to Russia had long been realized, and ever since the beginning of hostilities great and sustained efforts have been made, not only to complete the port itself in every respect for the reception and unloading of ships, but to complete the Murman Railway to connect the port with Petrograd. There is reason to believe that both port and railway are now ready for use.

Kola Bay.—If the Germans could seize the sea-board railhead, and establish railway communications either with Helsingfors or Petrograd—which they can occupy when they will—they could establish there a new submarine base free from the very patent disadvantages of those from which her under-water craft have now to operate. If we suppose, as seems likely, that the English channel will before long be made impassable for the submarine, and further suppose that the enemy's main field of operations must always be the western end of the Atlantic lanes, Kola Bay will only be some 600 miles further from the submarine destination: a very inconsiderable handicap when it is remembered that, in exchange for 600 miles of well-patrolled and, therefore, highly dangerous passage, the U-boats will have but double this distance to go—and a journey in which almost complete immunity from attack may be expected.

All these considerations have long been before the allied governments, and it cannot be doubted that some and, let us hope, adequate measures have been taken to prevent, not only the Murman Railway with its port,

but, if possible, Archangel, too, from falling into enemy hands. Should certain measures, however, not prove adequate, new duties will be thrown on our naval forces, and it is perhaps worth considering what they must involve.

The advantage of a Kola Bay port to the Germans would be the possession of a port free from what might be called the geographical shortcomings of her present naval bases. It is, of course, not a base that would be of value for anything except for submarine work, for it is inconceivable that any useful number of surface ships—even of the fastest destroyers—could pass through our guard and reach so distant a point in safety. And from this it follows that it is *in theory* a port, the use of which by submarines could be denied to the enemy by close investment. As has so often been pointed out, the present German bases cannot be blocked by a mine-barrage because mine-fields must be protected by surface ships, because the integrity of the German Fleet would make the defence of a mine-field near to the German harbors possible only by employing our own battleships there, and because to employ our battleships in narrow, shallow, and uncharted waters, would expose us to such disadvantages as to make the risk almost impossible. But if no powerful surface ships could be brought into Kola Bay, then a close investment of this inlet by a mine-field, watched by surface vessels more powerful than anything the enemy could have there, should, as I have said, be possible. But I use the phrase "*in theory*" because the actual operation would present extraordinary difficulties. For we should be, presumably, without a base on the Murman coast ourselves, and to maintain an inshore watch in the Arctic regions, 1200 miles or more from the nearest port in which it would be possible to refit ships and refresh crews, would be an undertaking entirely without precedent in warfare. Emphatically, therefore, the problems that must arise from the German possession of a port in Kola Bay are far better dealt with by prevention than by cure.—*Land and Water*, 11/4.

AMERICA'S FIRST MILLION TONS OF SHIPS NOW AT SEA.—The first million tons of ships completed and delivered to the United States Government under the direction of the Shipping Board have been put on the high seas to help defeat Germany.

A total of 159 vessels of 1,108,621 tons was completed up to May 11, according to statistics compiled by experts of the Shipping Board. Since January 1 more than half of the total tonnage, 667,896, has been delivered, and the monthly totals have shown a steady increase.

Most of the ships delivered were requisitioned on the ways or in contract form when the United States entered the war. Virtually all are of steel construction. None of the ships of the great wood program has been delivered, although 46 have been launched, due to delay in obtaining boilers and other machinery. The first completed wood ship built on contract for the government now is undergoing speed trials off the Pacific coast. Deliveries of ships last week were made at Seattle, Sparrows Point, Md.; Chicago, Ecorse, Mich.; Gloucester, N. J.; Wilmington, Del., and New York.

It was said to-night at the Shipping Board that boilers for about half the wooden hulls have been delivered and are awaiting installation.—*N. Y. Herald*, 15/5.

NEW U-BOAT RAIDERS TO COMBAT DESTROYERS.—*Frenchman Reports Latent Under-Sea Plans of Germany as Formidable*.—Realizing that the United States and allies have gained the mastery over the present type of submarine, Germany now is said to be planning a new series of big U-boat cruisers with which she hopes to again assume the offensive in her unrestricted under-water warfare.

Announcement of the new German scheme was made by Georges Leygues, the French Minister of Marine, in a recent interview, copies of which

have been received here from France. No details regarding the new U-boats were given by M. Leygues. From information from other sources, it appears that the cruiser submarines will be heavily armed and armored, and will be designed especially to meet the menace of the torpedo-boat destroyers which have proved so effective in hunting down the smaller submarines now in operation.

M. Leygues declared that the Allies are ready to meet Germany's new efforts and that they will not rest upon the "fine results obtained" in the past.

"We shall not stop," he said, "until we have cleaned up the sea as one cleans up a trench."—*Evening Star*, 14/5.

NAVAL AFFAIRS IN THE NORTH AND ELSEWHERE.—Recent British naval successes in the Cattegat, minor though they were in extent, differ greatly in character from the raids occasionally ventured upon by the Germans against the small auxiliary vessels guarding the Straits of Dover. The former were sustained efforts at a distance of 500 miles from home bases, and the latter are merely "tip and run" dashes to points well within an hour's easy steaming from either Ostend or Zeebrugge. Quite apart from material gains the Cattegat affair demonstrated that the command of the sea in the north, and, for that matter, the world around, is held in the clenched fists of the Allies; so far, indeed, from the British High Sea Fleet being "in hiding," it is eager and ready at a drop of the hat to engage the High Sea Fleet sulking behind its mine-fields and unwilling even to support the trawlers virtually destroyed in its own protected waters.

Now that the uncompensated hazards of attacking Wilhelmshaven or the mouth of the Elbe are recognized, some attention has been directed to the possibility of laying sea barriers across the lanes through which German submarines gain access to the ocean. But apart from the discontent this has excited as fresh evidence of a policy of attack, but not of defence, the possibility of associating nets and mines over the wide areas to be covered is not generally advocated, particularly as similar experiments have been discouraging.

Whether justified or not, it has to be accepted that considerable disquiet exists at the alleged lack of "initiative" on the part of the allied fleets, and that insistence is laid on the fact that a systematic defensive policy has always proved to be the most costly and disappointing form of warfare. This is finding especial expression since the collapse of Russia and the possibility that the Germans may take over its disintegrated fleet, or, in any event, find in the undisputed Baltic a safe region for that training of their ships and personnel so long denied. Little alarm is felt over any probable issue from the Dardanelles of the Black Sea Fleet, led by the *Goeben*. The combined French and Italian squadrons muster at least 17 dreadnoughts, and these, with their auxiliaries, should be able to take care of the heterogeneous vessels fresh from the Black Sea and of any reinforcements the Austrians may be able to send out from Pola.—*N. Y. Herald*, 19/4.

GERMANY DREADS SEA FIGHT, LOGIC OF BRITISH SHOWS.—The British naval success against German mine-sweepers in the Cattegat recently, says the *Daily Telegraph*, is sufficient answer to the Germans, who say that the British Grand Fleet is hiding.

Contrasting the British fleet in the Cattegat with the German raids in the Straits of Dover, the *Daily Telegraph* states that while the Germans in their bases on the Belgian coast are only 20 miles from the Straits, the exploit in the Cattegat was a carefully planned operation conducted more than 500 miles from the nearest point on the British coast.

"Such a sweep," the newspaper adds, "can be made only by a power in real control of the sea confronted by an enemy who will not risk protecting his small craft and suspecting that such intervention might be the

prelude to a general action, which he desires to avoid. The Germans had large naval forces near the scene on this particular Monday. They did not send them out, but, on the contrary, permitted 10 trawlers to be destroyed virtually under their own eyes."

The newspaper then discusses the theory that the Germans might be inviting naval action near their mine-fields and coast defences, and says that all such suggestions have no foundation among those who have knowledge of naval conditions.

The enemy, it says, has gained little new strength for use in the North Sea by the Baltic situation, while British superiority has been increased since the battle of Jutland by the co-operation of the American forces, and the entire naval strength of the United States would be available if necessary. Moreover, if the German naval forces were to be employed advantageously as the right wing of the German Army, they should have been thrown in before and not during or after the opening of the battle in France.

"If a naval battle," it continues, "could by any possibility have been decided in Germany's favor, she would have been saved the necessity of pressing forward her army and would have spared hundreds and thousands of casualties, which, on her own confession, she could not afford.

"A battle on the sea is fought simply to gain the right to use the seas for military or economic purposes. The Germans have wanted to attain that end for three years and eight months, and if they have not done so while the odds against them were less heavy than they are to-day, the reason is on the surface.

"Still we can dismiss from our minds all unsupported rumors. The watch by sea was never maintained more efficiently or more effectively than the Grand Fleet is maintaining it at this moment."—*N. Y. Herald*, 19/4.

THE DESTROYER IN THE WAR.—By M. B. Dill.—Naval authorities have frequently remarked during the course of the war, that as far as the navies of the nations are concerned, modern warfare has been much different than was ever expected.

This fact is due almost entirely to the submarine menace which has changed the plans and problems of the navies of the world in a most unexpected fashion. One of the surprising developments which has come about has been the sudden prominence of the destroyer in naval engagements and for general utility service. This new importance of the destroyer is one of the changes in naval warfare brought about largely by the activities of the German submarine against neutral and enemy commerce.

A few months before the war many of the allied naval authorities were inclined to look upon the destroyer as a type destined possibly to an early disappearance. The destroyer it was believed would be superseded by the swift submarine, just as it had taken the place of the torpedo-gunboat of two decades before. But the submarine while constantly growing larger and more effective has yet to develop the under-water speed and the surface offensive power which would make her supersede the destroyer.

One of the early proposals of the Navy Department when war was declared was for an immense emergency fund for building destroyers to cope with the submarine peril. This fund has been utilized effectively and already many new destroyers have come into the American Navy and each day there is unofficial recognition of the launching of more fresh ships of this type. The allied and enemy powers have also devoted considerable of their naval building efforts to the construction of destroyers. It is estimated that Germany has probably added from 80 to 100 destroyers to her battle fleet, for these little vessels have appeared bearing numbers that under peace time conditions would have been given to ships which would be built in the 1919-20 building programs. England has devoted more attention to destroyers and as early as the battle of Jutland, many of

these craft were on hand, which were not listed in pre-war naval directories.

Having to combat the submarine menace the Allies naturally give more attention to destroyer construction than the enemy has, for the destroyer has proved to be the most feared enemy of the submarine. The destroyer bridges the gap in modern naval construction that lies yawning between the light cruiser and the seagoing submarine. It fills in between these two types and performs duties for which neither are completely fitted.

The destroyer has the advantage of superior mobility and greater offensive power in general engagements. That this latter strength is superior to that of the submarine is evidenced in direct contest, by the fact that more submarines have been sunk by destroyers than destroyers by submarines. The submarine is a formidable menace to heavy surface vessels more than it is to destroyers, because of their deeper draft which makes them more susceptible to torpedo attack. As a result of this the heavy ships now depend on destroyers to ward off torpedo attacks.

The destroyer is also more formidable against heavy ships in a pitched naval battle than the submarine. For example, in the battle of Jutland which is our one outstanding example of a purely modern naval battle, it was demonstrated that as a weapon against capital ships the destroyer was superior to the submarine. No capital ship fell a victim to a submarine, but several were sunk by the active destroyer.

The destroyer is invaluable in rendering assistance to a battle squadron. It can blind and confuse the enemy gunners by the use of the smoke screen which is also an effective weapon of the destroyer when doing convoy duty. It can beat off torpedo attacks on the surface or from submarines, or it can dash in against the enemy line, attack him with torpedoes, and speed out before being struck. The submarine has not been developed to do any of these things effectively, because of its more limited maneuvering power, lower speed and greater vulnerability.

The destroyer is a type that has had a tendency toward uniformity in all navies. There has been less variation in the general lines than in any other kind of vessels. The displacement of the destroyers built by naval powers just previous to the war ranged about 1000 tons, the speed was from 29½ to 35 knots and the armament generally included several guns of about 4-inch caliber and torpedo tubes. In minor details there was naturally some divergence. The British tended to make the destroyer a gun-boat and carried only about six torpedo tubes. The Germans laid stress on the torpedo with only a couple of guns of low velocity. In the United States both defensive elements were worked for, and the 1914 type had 12 torpedo tubes and four 4-inch guns.

The Bouclier type of the French compromised on these features and this class varied between 690 and 900 tons displacement, and were equipped with four tubes and two 4-inch and four 9-pounder guns. The same ship made 35.4 knots, a speed that was regarded as extremely high at that time.

Italian naval constructors followed lines of their own as Italy has in most of her war vessels and military weapons. The *Indomito* type was one of the early destroyers, in 1911, with 700 tons and 35 knots. The *Carlo Mirabello* type raised its displacement to 1500 tons, but reduced the speed to 32 knots. The Italian late destroyers carried 4.7-inch guns, but usually had only three torpedo tubes.

Russia developed one of the most powerful types of destroyers known, following the lines of their model ship the *Novik*. The *Novik* was 338 feet in length, displaced 1260 tons and had the speed of 37.3 knots developed from engines of 40,200 horse-power. She carried four 4.1 quick firers, several lighter guns and had six torpedo tubes mounted in pairs. She had a wide range of action because of her capacity for fuel oil. Thirty-six of this type were under construction in Russia when war was declared.

Chile, among the smaller naval powers, always interested in things maritime, developed the destroyer considerably. Most of the Chilean boats

were built in Great Britain and they approached the light cruiser type. Vessels which she ordered in 1910 displaced 1430 tons and made 32 knots. They had six 4-inch guns and three torpedo tubes. High freeboard and plenty of room for the crew with a fuel capacity of 500 tons, made these ships very habitable and seaworthy, features which most destroyers often sacrifice to speed and mobility.

These illustrations show that while displacement has been gradually increased until many destroyers merge into the third-class cruiser type, the general tendency has been to keep the size within the 1000-ton limit. Enlargements have been mainly with the desire to give the craft heavier armament and greater seaworthiness.

The destroyers of the United States have in their latest manifestations been somewhat larger than the European type, since America in building her naval ships has always figured on the fact that any potential foe would most likely be a considerable distance from her shores. The destroyer from America must therefore be a vessel that could go to a foreign battleground, be provisioned with fuel and supplies to do duty there and possibly be able to return to her home port for further supplies. The latest pre-war vessels in the United States were the *Conyngham*, *Wilkes*, *Jacob Jones*, and *Wainwright*. These ships were between 1125 tons displacement and 1224 tons. Their speed averaged about 29 knots or slightly over and their offensive armament consists of four triple torpedo tubes, for 21-inch torpedoes and four 4-inch rapid guns, which throw a 33-pound shell.

Later destroyers authorized before war was declared were of 1125 tons displacement and made a speed of 30 knots, with comparatively the same armament as the somewhat earlier types. An improvement in seaworthiness has been made by the Navy Department recently, by the introduction of the flush-deck destroyer. Formerly the destroyer was featured in almost every country by the raised forecastle. The new ship has the advantage of permitting the heavy seas to sweep freely over the deck, thus causing less friction and rolling and less shipping of water in rough weather.

The destroyer has developed as the result of the invention of the torpedo, coming into being first in the Civil War, when Lieut. W. B. Cushing used a spar torpedo and a launch to sink the Confederate ship *Albemarle*. The Confederates had used a sort of torpedo mine early in the war and though disapproving of these naval tactics the Federal government adopted the spar torpedo as an adjunct to the navy.

The first torpedo-boats from which come the modern destroyer were very small, the theory being that they would come up on the enemy under cover of darkness. The Whitehead torpedo brought about the enlargement of the vessels carrying them. Then a weapon to attack the torpedo-boats was developed and the modern destroyer was under way.

Late naval strategy calls for four destroyers to one capital ship for safety and correct naval warfare. The United States did not develop destroyers in this proportion though the general board frequently recommended that such be done. To-day we are making up for these cuts in the naval program by rushing destroyers for service abroad.

Starting out with a spar torpedo as her only weapon, the destroyer of to-day has almost every known variety of offensive weapon designed mainly for attack against submarines. The triple torpedo tubes totalling usually 12 tubes in number on American ships, the light guns which can outrange the submarines' batteries, the depth bomb, and the non-ricochet shell make the ship formidable. In fact probably only an improvement of the destroyer's microphone for detecting a submarine under water, stands in the way of permitting this craft to clean out the U-boat with ease.

A gratifying feature of the new destroyer program with which America is making up for lack of preparedness in this line, is the increased speed with which the new vessels are being turned out. Whereas the pre-war speed for making destroyers was about two years or 18 months, to-day

the record made recently for the new type destroyer was 51 weeks from the laying of the keel. With records of this kind in construction, it will not be long before a most formidable fleet will be on hand to guard the new merchant marine and to assist the battle fleet when the time for a naval engagement comes.—*The Naval Monthly*, May.

LESSONS OF THE WAR

LOSSES IN NAVAL WAR.—By Percival A. Hislam (British).—The character of naval losses has undergone a considerable change since the last great wars in which we were engaged, and to this a variety of causes have contributed. The substitution of steam for sails has rendered ships less liable to the ordinary perils of the sea; while it is not necessary for us to-day, as it was in Nelson's time, to keep in commission a large number of small ships for the special purpose of dealing with the enemy's privateers. To a very large degree the U-boat stands to-day as the modern, degenerate representative of the old-time privateer, and the destroyer counterparts the light craft that used to be employed for hunting down the hostile corsairs; but while the destroyer is a great advance in seaworthiness over the 8- to 16-gun vessel of the beginning of last century, the losses among this type have been, as one would expect, relatively heavy. The greatest revolution of all in the cause of naval losses is due to the change in the material used in ship construction and to the development of methods of attack. Speaking comparatively, the wooden warship was unsinkable in action. There was no means of attacking her beneath the water-line, and the damage caused by chance shots striking between wind and water could usually be made good from within with very little trouble; while in the case of shot striking above the water-line, their only chance of doing considerable material damage lay in the possibility of causing a fire. Ships that were badly knocked about and had lost their masts were frequent victims to bad weather before their injuries could be made good; but the general chance of a vessel being actually sunk in action is indicated by the fact that out of 162 units of the Royal Navy lost in the five years 1804-1808, inclusive, only two were lost in this way. One was the 10-gun hired cutter *Constitution*, Lieut. J. S. A. Dennis, sunk in August, 1804, by a 13-inch shell which crashed through her deck while she was engaging the enemy batteries and flotilla at Boulogne; and the other was the *Rapid*, 12, Lieut. Henry Baugh, sunk by batteries in the Tagus in May, 1808. Within the same period two of our vessels were sunk to avoid capture. In the present war this has been done by the Russian *Prut*, and by the German disguised minelayer *Meteor*, which after sinking the British auxiliary *Ramsey* in the North Sea on the 8th of August, 1915, destroyed herself the following day to avoid capture by a squadron of our cruisers. The British steamer *Turritella*, made prize by the raider *Wolf* and converted into a minelayer, was similarly destroyed. It is understood that this variation of hari-kari is observed with unusual determination by the crews of enemy submarines.

The capture of a commissioned ship has been a very unusual feature of the present conflict, and this for several reasons. In the old days—the Nelsonian period—the main object in battle was to disable the enemy's armament, and his destruction was probably never aimed at deliberately. This, it will be remembered, is the theme of Sir Reginald Custance's "Ship of the Line in Battle," in which it is argued that the "defeat" of the enemy and the disablement of his guns are the objects to be sought. It is much to be doubted, however, if in any naval action of the present war a single shot has been fired with the object of disabling the armament or "defeating" the crew of an enemy warship. The objective is always the ship—and her destruction. It could hardly be otherwise, seeing the ranges at which modern engagements may be fought, the urgent need for the most rapid fire possible consistent with accuracy, and, more important

than anything else, the fact that the destruction of the ship involves *both* the defeat of its crew and the disablement of its guns, and is a much more practicable proposition from the gunnery point of view than an attempt to demoralize a ship's company with a hail of small projectiles or to knock a turret over the side. The material, structure and contents of a modern ship of war all tend to make her destruction a relatively simple matter compared with the task that faced the gunners of a hundred years ago, while torpedoes and high explosive projectiles have helped considerably to banish the word "surrender" from the vocabulary of modern navies. A ship's armament may be annihilated and her crew demoralized; but there is rarely or never an appreciable interval between the one or the other and the plunge to the bottom. The best remembered case of surrender in the present war is that of the *Emden*, which gave in to the *Sydney* after suffering heavy losses and being driven aground. In at least one official document the incident is referred to as the "capture" of the *Emden*, but "destruction" is the word commonly used. A more remarkable capture, accomplished without the firing of a shot, was that of the German gunboat *Komet*, taken by surprise in New Guinea by the late Lieut. Commander J. M. Jackson and a boat's crew from the Australian auxiliary vessel *Nusa*. The *Komet* is now in service. The capture and recapture of the gunboat *Firefly* on the Tigris will also be recalled.

Nothing came as a greater surprise in the early days of the war than the number of officers and men involved in the unfortunate incidents that occurred. Not a soul was saved from the *Good Hope* or the *Monmouth*, while over 1400 lives were lost when the *Aboukir*, *Hogue* and *Cressy* were torpedoed. It has been stated that in the naval campaigns of the Russo-Japanese war the combined losses on both sides were only 1883 killed and drowned, and 1809 wounded; but the figures do not seem to carry conviction. Here, however, are the losses sustained by the British Fleet in five of its most renowned fights of the sailing days:

	Killed	Wounded
1st of June, 1794.....	290	858
St. Vincent	73	227
Camperdown	203	662
Nile	218	678
Trafalgar	449	1242

The total of killed in these five victories did not exceed by more than a hundred the loss of life involved in the destruction of a single British battle cruiser, the *Queen Mary*, in the battle of Jütland Bank. According to a table published in "Naval Power in the War," by Lieut. Commander C. C. Gill, U. S. N., the German Admiralty claim that the British loss in this action amounted to 117,150 tons and the German to 60,720 tons, while the personal losses are given as 6105 and 2414, respectively. There is no means of testing the latter; but it may be pointed out that in the list of officers and men killed in action, printed with the quarterly "Navy List," our total losses for the month of May, 1916, were 324 officers and 5348 men. The aggregate for the month, therefore, does not equal the German claim for the Jutland battle; which, of course, undoubtedly accounts for practically this entire list. It will be observed from the above table that in the old sea fights the wounded outnumbered the killed in the proportion of just about three to one. Under present conditions the tables are most emphatically turned, the principal reason being the poor chance a wounded man has of being saved from a doomed ship.

The latest edition of *Fighting Ships* contains a pretty complete list of the known naval losses of the various powers during the war. In preparing the following analysis I have included in addition the armored cruiser *Drake*, torpedoed by a submarine on the 2d of October, 1917, and the monitor *Raglan*, destroyed by the gun-fire of the *Goeben* on the 20th of January, 1918. These vessels are not included in the list referred to.

The table which follows represents armored ship and cruiser (not light cruiser) losses only:

British Armored Ship Losses Reported in the War Down to the 23d of February, 1918

Cause of loss	No. of ships	Tonnage	Percentage of tonnage to total of loss
Torpedoed by submarine.....	14	143,525	33.52
Sunk by gun-fire	10	136,885	31.98
Sunk by mines	7	76,110	17.78
Destroyed by internal explosion.	3	47,800	11.17
Torpedoed by a surface ship....	1	12,950	3.02
Wrecked	1	10,850	2.53

It will be seen that the two forms of under-water attack—the sinking of the *Goliath* by a Turkish destroyer being omitted from this category—accounted for 21 ships out of 36, and for 51.3 per cent of the destroyed tonnage. It should be pointed out that in spite of very definite official statements, a good deal of doubt is still entertained in many quarters regarding the actual cause of the loss of the *Hampshire*, which is stated to have been mined; and there is some difference of opinion, also, as to whether the *Irresistible* and *Ocean* were sunk by mines (as officially recorded), or by torpedoes, possibly dirigible, on the Brennan principle, discharged from concealed shore stations in the Dardanelles.

The principal fault with the above table is that it includes only three groups—or, perhaps, one should say but two—of the many that go to make up a navy. It is, however, impossible to extend it with any real satisfaction owing to the insufficiency of the published facts regarding the minor types, particularly in regard to tonnage; but the inclusion of these types would make a considerable difference both to the aggregate and the distribution of the causes of loss. The following, for instance, is a statement of the losses of armed merchantmen announced by the Admiralty during 1917:

Laurentic, believed mined; *Hilary*, torpedoed by submarine; *Otway*, torpedoed by submarine; *Champagne*, torpedoed by submarine; *Orama*, torpedoed by submarine; *Stephen Furness*, torpedoed by submarine; *Arbutus* and *Grive*, foundered after being torpedoed by submarine; *Osmanich*, mined. Under-water attack accounted for the whole of these ships, and as, apart from drifters and trawlers, we lost from gun-fire in the same year only the seaplane carrier *Ben-my-Chree* and the destroyers *Strongbow*, *Mary Rose*, and *Partridge*, it is obvious that the inclusion of all classes of vessels would effect an appreciable change in the complexion of the table. It should also be pointed out that of the loss by gun-fire shown above, no less than 76.5 per cent of the total tonnage was lost in the Jutland fight (six ships of 104,700 tons), so that another action of this sort—the probability of which appears to grow less with the prolongation of the war—might be reasonably expected to send up the gun-fire total considerably; unless, of course, we should have the good fortune to discover, what so many navy critics appear to demand, an admiral who can win battles without sustaining losses.

The estimate of losses is, of course, one of the most essential duties of a staff, for the decision as to whether a certain operation shall be undertaken must inevitably rest in the end upon the comparison between the results to be achieved and the price to be paid in attaining them. The first report of the Dardanelles Commission is the only document so far published which gives us an actual insight into the working of the staff system in the navy—or of what passed for a staff system in the early months of the war—and it contains two interesting references to this very subject. Lord Fisher had stated that in his opinion he attended meetings of the War

Council simply that he might answer questions if he was asked. The question was put: "And were they ever asked?" To which he replied: "They were sometimes, because I was asked how many battleships would be lost (in the attack on the Straits), and I said 12." The War Council thus knew, from the highest professional advice they could obtain—that of the First Sea Lord—that the forcing of the Dardanelles would cost 12 battleships. In full possession of that knowledge, they decided upon that operation; but they quickly dropped the whole business—that is, the purely naval attack—as soon as we had lost three. This is one of the difficulties inseparable from the constitutional policy of leaving high decisions in the hands of civilians. They neither understand the advice they receive from the experts nor appreciate the fact that success in war cannot be achieved without paying the due price for it. They are willing to try things as a speculation so long as they can back out when their nerve begins to give; and when the *Ocean*, *Irresistible* and *Bouvet*—25 per cent of our expected losses—went down in the Dardanelles, they probably recollected suddenly Lord Fisher's warning that "even the older ships should not be risked, for they cannot be lost without losing men, and they form the only reserve behind the Grand Fleet." Of course, Mr. Churchill produced "an elaborate analysis" of comparative naval strength, conclusively showing that Lord Fisher was a querulous old gentleman whose fears were groundless and that we could quite afford the probable losses; but in spite of this the whole business was dropped like a hot poker after the first day's losses. Mr. Churchill has since put the blame for this upon the public, who are said to have been staggered by what was happening; but if politicians have any value at all in this sort of work it should surely be as a guide to how the electorate, which they know so well, is likely to behave in a particular set of circumstances.

One of the notable features of the war from the standpoint of the present article is the steady increase in the loss of destroyers. This is strongly shown in the following half-yearly analysis, which is not based exclusively upon official announcements. The information embodied in it has been accumulated from a variety of sources.

Half-year	British destroyer losses (For explanation, see below)					
	A	S	M	W	C	Total
Aug. '14-Jan. '15	-	-	-	I	-	I
Feb. '15-July '15	-	I	I	I	-	3
Aug. '15-Jan. '16	-	-	2	I	-	3
Feb. '16-July '16	8	-	I	-	2	11
Aug. '16-Jan. '17	3	-	I	-	2	6
Feb. '17-July '17	I	I	8	-	2	12
Aug. '17-Jan. '18	3	3	4	3	2	15

Explanation.—"A" = sunk in action with surface ships; "S" = sunk by submarine; "M" = sunk by mine; "W" = wrecked; "C" = sunk in collision.

The "steady increase" referred to above will be the more marked if one rules out the eight vessels sunk in the Jutland battle; but even with those included the losses for the last two periods covered were greater than those of the first five. In the case of such vessels as these, which are constantly at work discharging all sorts of functions under all sorts of conditions in all sorts of places, a great deal will naturally depend upon the number in commission, and although nothing official has transpired on this particular subject, there is very good reason to believe that we have at least twice as many destroyers in service to-day as we had in the first month of the war. Such an increase legitimately permits of greater risks being taken; and it also means that when there are mines about there is a greater chance of one of them being hit, and that there is an increase in

the number of targets available for enemy submarines. It is, in short, impossible to judge of the real significance of these destroyer losses without knowing the number over which they are spread and the work they have been doing. The improvingly satisfactory position in which, according to Mr. Lloyd George, Sir Eric Geddes and Lord Jellicoe, we find ourselves with regard to the submarine menace is very largely due to the work of our destroyers, and only those who can see both sides of the ledger can balance up the profit and the loss and see where the real truth lies. It would be worth a very great sacrifice to overcome the submarine menace, and certainly the advance in our destroyer losses is far from disproportionate in comparison with the fact, of which we have been officially assured, that towards the end of 1917 the destruction of U-boats was proceeding at four times the pace we reached in the previous year.

In the last period covered in the above table the number of war vessels of all classes announced by the Admiralty as having been sunk by submarines was 18, if we include the three destroyers lost in the North Sea on the 22d of December, while in the previous six months corresponding (August, 1916, to January, 1917) the number was only six, and this included the *Nottingham* and *Falmouth*, which were operating with the Grand Fleet to meet the German sortie of the 19th of August, 1916, and also the battleship *Cornwallis*, sunk in the Mediterranean. It seems highly probable that there is a distinct and direct connection between, on the one hand, the growing success of the campaign against the U-boat and the reduction in the rate of loss of British merchantmen, and, on the other, the increase in the loss of warships through under-water attack. We know, for instance, that the convoy system was brought into general use during the early half of last year, and there is no doubt that this tends very appreciably to increase the risks run by warships. Indeed, it may be said that it is the purpose of the convoy system to shift the burden of risk from the merchantmen to the warships escorting them. In convoying through areas infested by submarines, it is the object of the escort to keep the U-boats at such a distance from the convoy that the latter cannot be attacked. In other words, the escort becomes a screen between the enemy and the merchant ships; and although the war vessels and their personnel are much better adapted for dealing with submarine attack, it follows that their chances of being torpedoed are increased in much the same ratio as those of the merchantmen are reduced. The attacks on the North Sea convoys in October and December last, resulting together in the loss of three destroyers and a number of merchantmen and armed trawlers, did not arise from any failure of the convoy system. The merchantmen were provided with an escort which, in the absence of evidence to the contrary, we may presume was adequate for its particular purpose, namely, their protection against submarine attack. For the checkmating of other forms of attack, other arrangements were made, and it was these which broke down, leaving the destroyers and trawlers exposed to an onslaught the like of which it was never expected they would encounter. At the moment of writing only one official announcement has been made regarding the torpedoing of an escort vessel, this being the *Mechanician*, which stranded and became a total loss in the channel after being "submarined" on the 20th of January last. It was not stated that she was accompanying a convoy at the time.

Reference may fittingly be made in this article to the loss of merchant shipping—a subject which even yet is not generally associated in the public mind with the shortage of food and the varied activities of Lord Rhondda. The first declared enemy campaign against merchant shipping opened on the 18th of February, 1915, and in the 35 succeeding weeks over which regular returns were issued by the Admiralty, we lost a total of 175 ships—an average of exactly five a week. The so-called "unrestricted" campaign began on the 1st of February, 1917, but the weekly official returns began, as before, on the 18th of February. The following table

summarizes our losses quarter by quarter for the first 52 weeks of this phase:

Sunk	1600 tons and over	Under 1600 tons	Fishing vessels	Total
1st 13 weeks	269	121	103	493
2d 13 weeks	237	52	45	334
3d 13 weeks	159	74	12	245
4th 13 weeks	157	48	21	226
Total	822	295	181	1298

U-BOAT'S BEST HARVEST FIELD.—In an article in the Stockholm *Afton-bladet* of March 24, Dr. K. A. Melin states that no less than 1650 vessels were sunk in the barred zone around England and France during the first year of Germany's unrestricted submarine warfare. Along the west coast of England 580 ships were sent to the bottom, while 430 were sunk in the English Channel itself. One hundred and seventy vessels were lost in the approaches to the English Channel and 270 along the east coast of England. Along the French coast only 200 vessels have been lost, which shows that the main effort of the German submarines has been directed against British shipping. Dr. Melin has not attempted to estimate the number of vessels lost in the Mediterranean area.—*Nautical Gazette*, 11/5.

ATLANTIC

U-BOAT IS LIFTED OUT OF WATER BY WARSHIP'S SHELL.—The sinking of a German submarine by an American warship with a shot which lifted the U-boat completely out of the water and broke her in two, was reported by officers of the warships on their arrival here to-day. Because of the fine work of the gunners, the crew of the vessel received an additional furlough of 10 days.

On the voyage over, the warship, which previously was reported from German sources as having been wrecked, sighted three submarines and the gunners sprang to their guns. The first two shots from the warship, fired in quick succession at the nearest enemy, missed the mark, but the third went home. It caught the U-boat just below the water-line and so great was its force that the submarine was lifted out of the water. In another moment her back broke, she doubled up and sank to the accompaniment of a chorus of yells from the warship's crew.

No survivors were seen in the water and the other submarines dived, as the destroyed submersible disappeared, and they did not reappear.—*N. Y. Herald*, 11/5.

TACKLED DEADLY BOMB.—*Boatswain's Mate Probably Saved Converted Yacht From Destruction*.—How John Mackenzie, a chief boatswain's mate in the Naval Reserve, by extraordinary heroism saved the converted yacht *Remlik*, on patrol service in European waters, was told to-day in an announcement by Secretary Daniels that the Navy Department had awarded Mackenzie the medal of honor and gratuity of \$100.

During a heavy gale December 17, a depth charge weighing several hundred pounds broke from its fastenings at the stern and went sweeping about the deck. As officers and crew watched the bomb, some one saw the safety pin fall out of the charge, making it a source of serious danger to the vessel and crew. Mackenzie, realizing the danger, shouted: "Watch me; I'll get it" and dashed down the deck flinging himself upon the charging cylinder.

Three times he almost had his arms about the bomb, but each time the seas tore it from him and once almost crushed him. He stuck to his task, however, and on the fourth attempt, got a firm grip on the cylinder,

heaved it upright on one of the flat ends and held it down until lines could be run to him and he and the bomb safely lashed.—*Baltimore Sun*, 29/4.

SEAPLANE CREW BATTLES SHARKS 18 HOURS.—Lieutenant Arthur Laverents, a naval aviator, and C. C. Cotton, his observer, arrived at an Atlantic port yesterday following a narrow escape from drowning and man-eating sharks last Sunday when their seaplane broke and they were forced to alight on the ocean sixty miles out from Miami, Fla.

For 18 hours the men drifted on their seaplane, acting as acrobats to prevent it from overturning when seas were rough and fighting all the time to keep sharks away. Luck was with them Monday morning, for they were sighted by an American steamship. The crew of the vessel also rescued the seaplane, which was hoisted to the deck and turned over to the naval authorities at the Atlantic port.

The story told by Lieutenant Laverents was that he and Cotton began their flight at noon last Sunday. They arose to 2000 feet. Suddenly, when 60 miles out to sea, it was discovered the engine was missing fire.

The seaplane was brought down and they tried to repair the cylinder. The gasoline tank also was leaking. Then they found they could not arise.

Sunday night was the longest either spent in their lives. Frequently huge sharks brushed against the frail craft and they had to fight them off. Finally, at six o'clock Monday morning, when they saw that the lookout in the crow's nest of the American steamship had sighted them, they were a happy pair.

Lieutenant Laverents is from Cheyenne, Wyo. He reported by wire yesterday to his commanding officer of his safe arrival and of the saving of the seaplane.—*N. Y. Herald*.

NAVY PATROL VESSEL LOST.—*The Admiral Goes on Rocks off Massachusetts Coast*.—The Navy Department is advised that the *Admiral*, scout patrol vessel No. 967, ran on the rocks off Scituate, Mass., last night, and is a total loss. All the officers and crew were saved, and considerable small material was taken off the vessel.

The *Admiral* was a converted yacht, which, before being taken over by the navy, belonged to Gordon Dexter, of Boston.—*Official Bulletin*, 27/3.

U. S. S. "ZAAANLAND" SUNK IN A COLLISION AT SEA.—The Committee on Public Information issues the following:

The Navy Department is informed that the U. S. S. *Zaanland* was sunk in collision at sea on May 13. All aboard were rescued, and will be returned to the United States.

The *Zaanland* was a cargo carrier, one of the Dutch ships taken over by the United States Government, and was 8700 tons dead-weight. It was commissioned and manned by the navy for army account.—*Official Bulletin*, 17/5.

U. S. S. "PARKER" MEN PRAISED FOR "GLENART CASTLE" RESCUES.—Secretary Daniels has commended the following men of the U. S. S. *Parker* for heroism in their effort to rescue the survivors from the steamship *Glenart Castle*, which sank on February 26, 1918:

John C. Cole, quartermaster, second class, United States Naval Reserve Force, and Jonathan T. Newman, seaman, United States Navy, seeing the condition of one of the survivors, requested permission to go to his aid. Permission was granted Cole, who succeeded in swimming to the man and holding him up. The strain of holding up the man in the cold water and choppy sea nearly exhausted Cole. Newman, seeing his condition, jumped overboard, but was ordered back by the executive officer, who felt that Cole would probably be lost and that further sacrifice would be useless.

Cole held on to the survivor, and both were finally rescued.

Roy E. Hoffses, chief boatswain's mate; Francis W. Beeghley, yeoman, third class; and James H. Quinn, coxswain, United States Navy, boarded a fragile raft that was smashing into the ship's side, secured the survivors and pushed them aboard, at considerable personal risk.

David L. Morgan, electrician, third class (radio), and Thomas F. Troue, United States Navy, were constantly in the water, pulling out survivors, all of whom were totally helpless. These men have also been commended for using good judgment when necessary to take risks, and for not hesitating on any occasion.

The fourth officer of the *Glenart Castle* having fallen overboard, Wilbur W. Matthews, ship's cook, second class, and David Goldman, machinist's mate, second class, United States Navy, jumped overboard, put a line around him, and aided him to the ship's side, where he was hauled aboard.—*Official Bulletin*, 16/5.

ABROAD.—In the face of bitter winter gales, American submarines, primarily designed for operation off the home coasts, have crossed the Atlantic to engage in the common fight against German U-boats. They are now aiding allied naval forces, as are American destroyers and American naval airmen, and they have been in the war zone for some months.

Secretary Daniels revealed the fact that the submarines had gone "over there" in his address at Cleveland at a Liberty Loan celebration, but gave no details. It is now possible, however, to tell for the first time of the mid-winter passage of the boats across the seas in the face of the most severe weather known in years. In the perilous passages, the best traditions of the service have been maintained.

The first submarine left in early winter. No hint appeared in the papers, and, in fact, until Secretary Daniels spoke, no word of the participation of the under-water boats in the war against Germany had been published.

The navy had some experience with long-distance work with submarines on which to draw. Boats have been sent to the Philippines, to Hawaii and to Panama, but always in mild seasons and with plenty of time for precautionary steps.

This time, however, they were to go in a terrible winter, with the Atlantic in its ugliest mood. The steps taken to get them across cannot be disclosed, but the fact that the department has no disaster to record is pointed to as proof of their sufficiency.

In mid-December others got started. While it was fair on sailing day, ahead of the submarines a 100-mile gale was brewing. Into it they plowed, rolling and tumbling.

Even when tow lines parted in some cases, unknown to the tugs and accompanying craft, the submarines battled forward alone. A majority of them reached their destination under their own power, ready for duty.

Some of the boats were driven far from their course. They showed up at different ports, but promptly put to sea again and reached their station.

One boat was the hard luck vessel of the lot. Separated from the flotilla in the first storm and its compasses out of order, it turned homeward, only to strike two more gales in quick succession. However, it made port successfully and undamaged.

With new fuel and supplies aboard and with a man or two, worn out by the long struggle with the elements, replaced, in a few days the boat put to sea again. It went through that time, despite a fourth gale it encountered.—*Naval Monthly*, May.

U. S. TRANSPORTS CRASH.—Secretary Daniels authorized the following statement:

"Two transports, which were damaged in a collision at sea several days ago, have arrived safely at an Atlantic port. The two vessels were in a convoy and were running without lights when the accident occurred.

Neither was seriously damaged, but both were ordered to return to port for repairs. No lives are reported lost.

"A board of inquiry will be appointed to make a thorough investigation of the accident."—*Washington Evening Star*, 27/4.

LINER ESCAPES U-BOAT.—A large French transatlantic liner which arrived here to-day was unsuccessfully attacked by a submarine when two days out from a French port. The torpedo passed astern and the merchantman gave battle. Cruisers convoying the liner joined in the fight and the U-boat fled with several of the warships in pursuit.

Whether the submarine was sunk was not known by any of the 285 passengers aboard the merchantman. The attack took place while the passengers were dining at 7 o'clock at night.—*Evening Star*, 29/4.

BIG BRITISH VESSEL ROUTS A U-BOAT IN MIDOCEAN FIGHT.—A British steamship which prior to the war was considered one of the best aboard which to cross the ocean, arrived yesterday at an Atlantic port with a story of a daring attempt by a German submarine to slide under the flock of destroyers convoying her and launch a torpedo. Luckily, the periscope of the Hun craft was discovered in time and a shower of shells from the guns of the steamship caused her to hurry away.

Passengers on board the steamship said, however, that before the final plunge of the submarine she let go one torpedo when a mile away, but it went wild, showing the Huns were in great fear of death and were excited. Destroyers closed about the spot beneath which the periscope was seen, but it was unknown whether the depth bombs thrown overboard destroyed her.

The steamship was one of the several under convoy from a French port when attacked and quickly changed her course. After discharging several Canadian troops on furlough the steamship headed for an American port, where the rest of the passengers were landed. Some of these were Australians.—*N. Y. Herald*, 5/3.

SHIP'S ARMED GUARD REPORTS ENCOUNTER WITH SUBMARINE.—The Navy Department authorizes the following:

The commander of the armed guard on the steamship *Tidewater* reports to the Navy Department that on March 17, about 11.30 p. m., a submarine was sighted off the starboard bow, heading toward the vessel about 150 yards off. As the ship turned it missed the submarine by not more than 20 feet. The U-boat was then submerging. The ship's guns were brought to bear and the first shot hit some distance ahead of her wake.

"The pointer fired the second shot," says the report, "and had what the captain, the chief engineer and myself, and other members of the crew called a clean hit and was satisfied that it was effective. The third shot was fired by the boatswain's mate in charge of the after gun's crew, having her spotted and firing in the position she last submerged in. We resumed our course and commenced zigzagging, standing by for an attack, but the submarine did not appear again. We made all preparations for an attack at daybreak, but there were no signs of a submarine."—*Official Bulletin*, 8/5.

A German submarine bombarded Monrovia, Liberia.—*Army and Navy Gazette*, 20/4.

TWENTY-NINE LOST ON "FLORENCE H."—Capt. F. J. Butterfield and all the deck officers of the American steamship *Florència H.* are now believed to have lost their lives when that ship was destroyed by an explosion April 17, while off the French coast. A list of survivors received here to-day by cable from the American consul at Brest does not contain their names. It is also shown that only two of the engine-room officers escaped uninjured, the others being reported as badly burned.

A checking up of the cabled list with the record of the crew filed with the United States Shipping Commissioner here when the *Florence H.* sailed shows that out of 56 men in the civilian crew 29 are dead or missing, 12 are in hospitals badly burned, 2 are slightly burned and only 13 escaped uninjured.

There is a possibility, however, officials of the United States Shipping Board here said, that some of the missing may yet be accounted for, but as the *Florence H.* was near a port when the explosion occurred, this hope is remote. Chief Engineer James B. Watson and First Assistant Engineer Strickland are among those who escaped injury, the second and third assistants being badly burned.

In addition to the civilian crew, there were on board 23 men of a naval guard, six of whom have been reported as survivors, through the Navy Department at Washington.

The *Florence H.* sailed from Philadelphia March 30, with cargo, part of which was explosives. A recent cable advice from Paris said that the explosion was believed to have been caused by a bomb planted on the ship before she sailed.—*Baltimore Sun*, 27/4.

The American steamship *Lake Moor*, sailing on her maiden voyage with a naval gun crew aboard, was sunk by an enemy submarine in European waters about midnight April 11 and 5 officers and 39 men are missing, the Navy Department announced to-night.

Five officers, including Lieut. Commander Kinchen J. Powers, U. S. N. R. F., and 12 enlisted men have been landed at an English port.—*Baltimore Sun*, 21/4.

COLLIDES AT SEA, SINKS.—The American steamship *Westerly*, one of the new ships built by the Emergency Fleet Corporation, was sunk in a collision Sunday off the French coast, according to information received in shipping circles. All aboard were saved.

The *Westerly*, a vessel of about 5000 tons, launched on the Pacific coast in February, was returning to the United States after having completed the first half of her maiden trip to Europe.—*Evening Star*, 30/4.

AMERICAN STEAMER "TYLER" TORPEDOED AND SUNK MAY 2.—The Navy Department has received from Vice Admiral Sims a dispatch stating that the American steamer *Tyler* was torpedoed and sunk May 2, 1918, in European waters. Survivors of the vessel were landed at a French port. Six of the merchant crew, including the third assistant engineer, and five members of the naval armed guard were lost.—*Official Bulletin*, 8/5.

NOTE.—The names of the members of the armed guard on the *Tyler* are being checked up by the Bureau of Navigation, and will be made public as soon as this is completed.

STEAMER "NECHES" SUNK BY TORPEDO, RETURNING WITHOUT CARGO, BUT ALL ON BOARD REPORTED SAFE.—The following statement is authorized by the Secretary of the Navy:

The War Department has received information that the *Neches*, a cargo carrier of 7175 tons, was torpedoed and sunk on the night of May 14 or early morning of May 15.

All on board are reported saved.

The vessel was returning without cargo.

It is believed that the vessel carried a crew of about 125 men.

No troops were on board.

The *Neches* was under charter by the United States Shipping Board. It was a steel ship, built in 1914, and had a speed of about 14 knots per hour.—*Official Bulletin*, 11/5.

MYSTERIOUS ADVERTISEMENT IN A SOUTH AMERICAN NEWSPAPER HINTS THE "CYCLOPS" WAS SUNK.—A story has been brought to the United States to the effect that, two weeks after the United States collier *Cyclops*, which has been given up as lost, left Barbados, on March 4, an advertisement was published in a Portuguese newspaper at Rio Janeiro announcing a requiem mass would be celebrated for the repose of the soul of Alfred L. Moreau Gottschalk, "lost when the *Cyclops* was sunk at sea." The story was brought by a British steamship arriving yesterday at an Atlantic port from Brazil.

Especial interest attaches to the advertisement, as it was published long before the United States Navy Department at Washington, on April 15, announced that the collier, with an immensely valuable cargo of manganese and 333 persons on board, was missing.

Efforts have continued since the appearance of the advertisement by the United States and Brazilian secret agents to discover the identity of the persons responsible for the advertisement, as it is believed they possessed information that the *Cyclops* never would reach the American port for which she was bound when she left Rio de Janeiro.—*N. Y. Herald*, 6/5.

SECRETARY DANIELS STILL HOPES TO FIND THE "CYCLOPS."—Although two months have passed since the naval collier *Cyclops* disappeared, Josephus Daniels, Secretary of the Navy, said to-day the department still holds hopes of solving the mystery, and has not yet officially recorded the vessel as "lost."

Systematic questioning of fishermen and residents of islands along the route the collier would have followed from the West Indies to an Atlantic port is continuing.—*N. Y. Herald*, 15/5.

ONE FRENCH GUNNER DEFEATS HUN U-BOAT.—Heroism of French sailors, of which so little has been learned during the war, is told with the official story of the French sailing patrol boat *Goeland II*.

During one of the blackest nights of January the *Goeland II* suddenly found herself under the point-blank fire of the two guns of a German submarine. Despite the fact that the ship was torn open beyond repair, the crew rushed to their single gun and went into action. Two gunners were killed before a shot was fired from the ship; a third calmly worked the gun alone and his second shell put the submarine's rear gun out of action. The U-boat then submerged and gave up the fight.

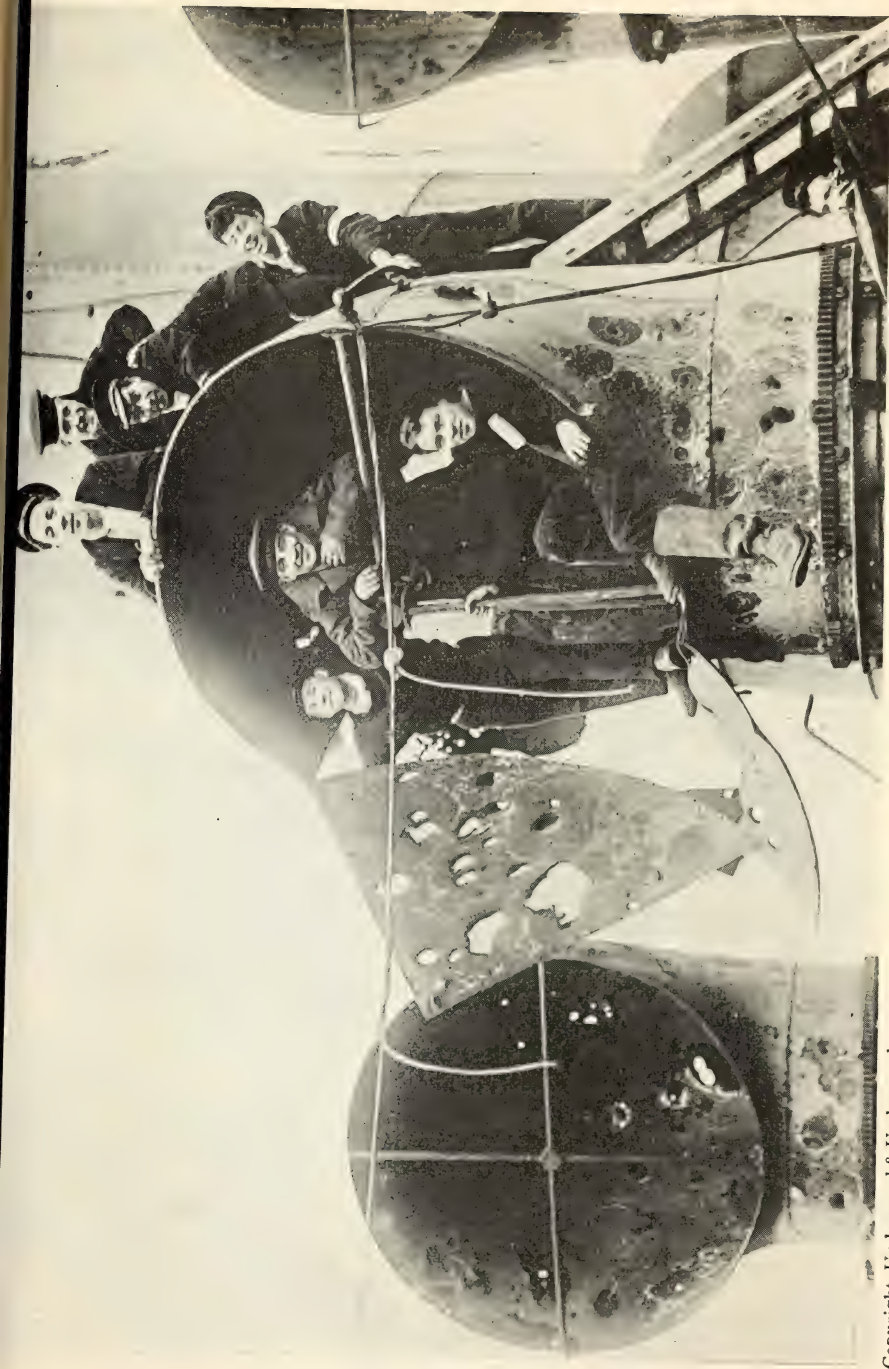
The *Goeland II* sank and with her the captain. The second mate, gravely wounded, directed the remaining men of the crew into the boats which were floating where the ship disappeared.

The Minister of Marine has endowed the brave second mate and the third gunner with the Military Medal and cited the deed to the Order of the Army.—*Baltimore Evening Sun*, 27/4.

BIG LINER "ST. PAUL" OVERTURNS AT PIER.—The American line steamship *St. Paul* overturned while being warped around her pier here to-day, after coming from a nearby dry dock. It is believed that all persons on board, between 500 and 600 workmen, escaped, but as the vessel lies two-thirds submerged, with her bow on the bottom and her stern high in the air, the military authorities were unwilling to announce that no one perished. It was considered possible that some of the men might have been caught in the interior of the ship and drowned.

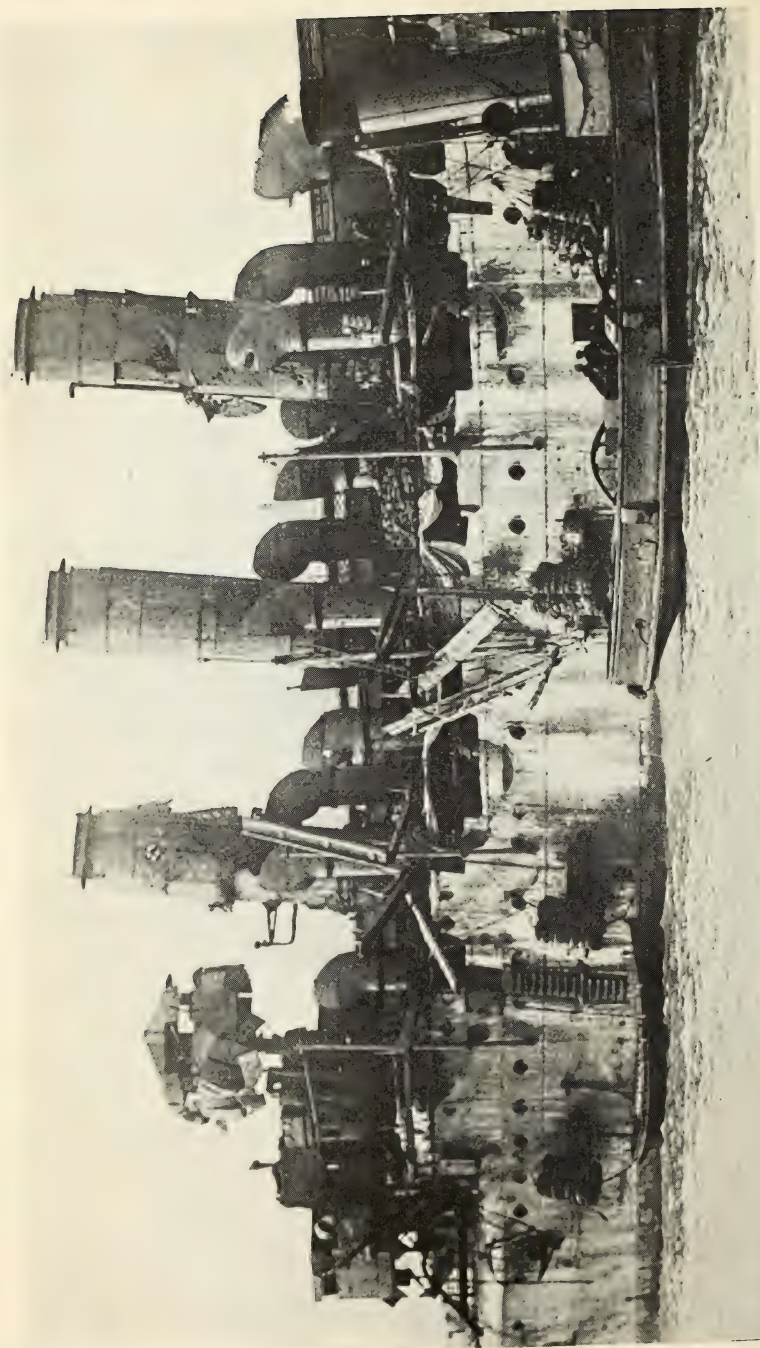
Whether the *St. Paul's* seacocks were left open or the ballast shifted, remains to be determined.

The *St. Paul*, one of the crack steamships of the American line, registers 11,629 tons gross. For many years she has been in transatlantic service, and during the war has taken to Europe and brought back as passengers many noted persons.—*Evening Star*, 25/4.



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CRUISER "VINDICTIVE" BATTERED BY GERMAN SHELLS AT ZEEBRUGGE, NOW SUNK ACROSS OSTEND CHANNEL.



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THE "VINDICTIVE," PHOTOGRAPHED IN A HOME PORT UPON HER RETURN FROM SUCCESSFUL RAID AT ZEEBRUGGE.

RAISING THE "ST. PAUL."—An ash port carelessly left open was believed to have flooded the American liner *St. Paul*, sinking her at her pier. However, so far no official announcement as to the cause of the accident, which probably caused the loss of lives, has been made.

Work of raising the vessel is progressing rapidly to-day. Meanwhile investigation to definitely place the responsibility for the sinking was conducted by army men.—*Baltimore Evening Sun*, 26/4.

NORTH SEA AND CHANNEL

GERMAN SHIPS SHELL COAST OF FLANDERS.—German torpedo craft bombarded the coast between Dunkirk and Nieuport, behind the allied lines in Flanders, yesterday morning, says an official statement from Berlin to-day. The text reads:

"Our torpedo-boats on Thursday morning fired 600 shells on enemy camps and storage places between Dunkirk and Nieuport."—*N. Y. Herald*, 20/4.

KATTEGAT SWEEP BY BRITISH SHIPS.—*Ten German Trawlers Sunk*.—The Secretary of the Admiralty made the following announcement last evening: Commander-in-Chief, Grand Fleet, reports having undertaken a sweep of the Kattegat on April 15.

Ten German trawlers were sunk by gun-fire, their crews being saved by the British ships.

There were no British casualties.

Reported Fight Near the Sound.—Copenhagen, April 15.—During the last few days numerous torpedo-boats and destroyers of foreign nationality have been observed at different places off the Swedish west coast near Halmstad (in the Kattegat). This morning six destroyers were seen firing at a sailing vessel, which at last took fire. Farther out at sea smoke and flames were seen, and about 100 shots were heard.

A special telegram from Helsingborg to *National Tidende* states that a fight has taken place between English and German vessels in the Kattegat northwest of Kullen (at the northern entrance of the Sound). A number of German trawlers are said to have been sunk. German battleships then came up, and the fight continued.

Enemy Vessels in Flames.—Christiania, April 15.—A correspondent of *Aftenposten* reports from Gothenburg that destroyers of foreign nationality were observed at 5.30 this morning eight miles off the Swedish coast shelling five ships which looked like German trawlers, and which all seemed to be ablaze, while some were about to sink. At 10.50 Marstrand fishermen saw the warships speeding rapidly northwest.—*London Times*, 18/4.

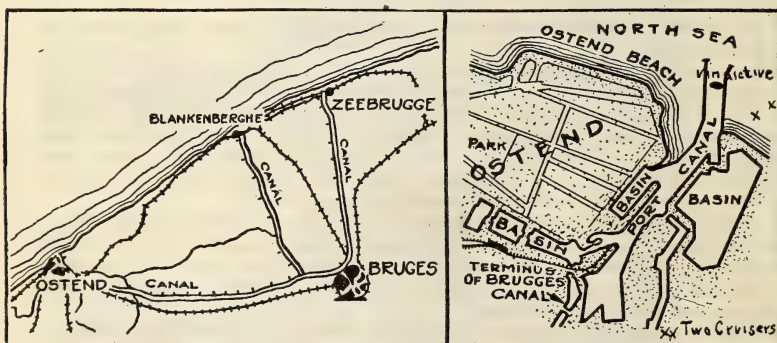
BRITISH AND GERMAN LIGHT NAVAL FORCES IN A SHORT BATTLE NEAR HELIGOLAND.—British and German light forces clashed on Saturday in the waters east of the great German fortress Heligoland, the British Admiralty announced to-day. After the exchange of a few shots at long range, the German warships took refuge behind their mine-fields. The Admiralty announcement says:

"British light forces operating in Heligoland Bight Saturday obtained touch with enemy light forces, who retired behind the mine-fields. A few shots were exchanged at an extreme range. One enemy destroyer was observed to be hit. All our ships returned without casualties."—*N. Y. Herald*, 22/4.

THE ATTACK ON ZEEBRUGGE AND OSTEND.—Those critics who have been calling for a strong offensive against the German submarine bases must have received their fill of satisfaction when they read of the dashing exploit of the British Navy against the German bases at Zeebrugge and Ostend. Germany could not have been struck in a more tender spot; for her writers, both military and naval, have always tried to impress it upon the Germans that the possession of the Belgian coast is of prime

importance in Germany's plans for the crushing of British sea power. German hunger for the possession of the Channel ports is largely responsible for the present fierce drive against the northern sectors of the British Army in France, and should she succeed in adding Dunkirk, Calais and Boulogne to Zeebrugge and Ostend, she will fight to retain them more fiercely perhaps than for any other object in the war.

The value of the two Belgian harbors lies in their strategic relation to the English Channel and the southerly half of the North Sea. Zeebrugge is the port of the considerable city of Bruges, with which it is connected by a canal which also extends between Bruges and Ostend. These conditions render both of these ports admirable bases for submarine operations; for the craft can lie in the canal beyond range of hostile gun-fire from the sea. The approaches to both ports are characteristic of the waters of the Belgian coast, which are shoal and underlaid by shifting masses of sand through which channels lead from deep water to the harbor entrances. Zeebrugge is protected from southwest gales by a curved breakwater or mole of masonry, which is connected, at its in-shore end, with the mainland by a bridge. The entrance to the docks of the canal is formed by two smaller breakwaters with a lighthouse at the end of each. About three-quarters of a mile in-shore are the lock gates which form the entrance to the docks and to the canal.



RELATION OF OSTEND AND ZEEBRUGGE
TO BRUGES.

OSTEND, SHOWING ENTRANCE
AND DOCKS.

From *Scientific American* and *London Times*.

Ostend has no large breakwater, the entrance to the docks and to the canal from the sea being formed by two piers, about one-quarter and one-half mile in length, and the harbor being a tidal one, there are the customary lock gates leading to the various docks and basins.

Both Zeebrugge and Ostend have been subjected to attack from the air by the British Naval Airplane Service, and considerable damage has been done from time to time. Latterly, as protection, the Germans have built heavy reinforced concrete shelters, under which the submarines lie during their overhauling and refitting.

The expedition, which was under the command of Admiral Keyes, was most carefully organized; and the various vessels that went into the harbor were manned entirely by volunteer crews. There is some doubt as to the exact composition and size of the attacking fleet, but judging from the rather fragmentary reports which have come to hand, it looks as though the fleet of raiding ships was accompanied by a considerable force of monitors armed with 12- and 14-inch guns which subjected both bases to heavy long-range gun-fire before the raiding vessels were sent in.

The fleet detailed for the raid consisted of five obsolete cruisers from 20 to 30 years old; the *Vindictive* under command of Commander Car-

penster; two large ferryboats which formerly did service between Birkenhead and Liverpool; two old submarines filled with explosives; and several destroyers and high-speed motor-boats.

The *Vindictive* is a protected cruiser of 5750 tons and 20 knots speed, built in 1897, mounting a battery of ten 6-inch guns, and nine 12-pounders. Her complement is 450 men.

The five obsolete cruisers, loaded down with masses of concrete, were designed to be sunk across the channel entrances so as completely to block them.

The two old submarines, which were crammed with explosives, were destined, one for blowing up the bridge connecting the in-shore end of the mole with the mainland, and the other for blowing up the lock gates, and so draining the docks and basins and the canal itself.



ZEEBRUGGE HARBOR.

From *Scientific American* and *London Times*.

The plan of attack was for the *Vindictive* and the two large ferryboats to lie alongside the outer wall of the mole and throw landing parties ashore, mainly for the purpose of diverting attention from what was being done inside the harbor, and partly for the purpose of destroying the batteries and the considerable amount of military stores located on the mole. Under the cover of this destruction, three of the concreted cruisers were to make their way through the harbor and sink themselves squarely across the channel.

After the preliminary bombardment by the monitors, which was so heavy that windows were shaken in the town of Dover, some 75 miles distant, the fleet advanced behind a screen of smoke. A change in the wind lifted the smoke screen just before the fleet reached its objective, and German star shells revealed to the enemy the daring nature of the attack. The *Vindictive* reached her objective, and with lines of grappling irons managed to get ashore two out of 14 special gangways—the other dozen having been shot away—which were stretched from the ship to the elevated parapet of the mole. Over these the crew from the *Vindictive* swarmed

ashore where they were joined by other landing parties from the ferryboats. They captured the guns on the mole, and turned them on the Germans, driving them back, and covering the line of warehouses, which were set on fire by flame throwers that had been provided for the purpose. The *Vindictive* was brought under extremely heavy gun-fire, but thanks to the protection of the mole, only her upper works were shot away, and the ship remained so far intact that she was able to withdraw with the wounded and survivors.

The attack on the mole seems to have been a complete success. One of the submarines made its way to the in-shore end, and after being placed below the bridge, the explosives were touched off and the bridge with the German troops gathered upon it was blown up. Meanwhile, the other submarine seems to have blown in the seaward gate leading to the docks of the Bruges canal—one eye-witness stating that, as he left, the water was pouring out through the gates and the vessels inside were straining heavily at their moorings. This, however, has not been verified in the brief Admiralty report. The three cruisers seem to have been sunk in position, blocking the channel.

As to Ostend, the results do not seem to have been so satisfactory although both of the concreted ships were sunk, and it is believed that the entrance channel is partly blocked. The crews from the concreted ships and the submarines were picked up by fast motor-boats and carried safely back to the main fleet.

Taken as a whole, this exploit is worthy to rank with the best cutting-out expeditions recorded in naval history. It was well conceived, and seems to have been carried out with great dash and coolness. Of course, the element of surprise was there—at least to a partial extent—and it is questionable whether other expeditions of this character will give equally favorable results; since the Germans, from now on, will presumably be at watch for further attacks. If the channels are blocked, and particularly if, as one account states, one or two dredges were sunk, it will be many days and possibly weeks before the submarines and destroyers which were sheltering in the basins and within the canal, will be available for service.—*Scientific American*, 11/5.

FULL STORY OF THE RAID.—*Twisting the Dragon's Tail*.—April 25 there was issued an official account of the great naval attack on Zeebrugge and Ostend on the morning of St. George's Day. It gives for the first time the names of the principal officers who took part in the enterprise, and announces that Vice Admiral Keyes directed the operation from the destroyer *Warwick*.

The story of the landing at the mole is told in the following words:

Vindictive was fitted along the port side with a high false deck, whence ran the 18 brows or gangways, by which the storming and demolition parties were to land. The men were gathered in readiness on the main and lower decks, while Colonel Elliot, who was to lead the marines, waited on the false deck just abaft the bridge, and Captain H. C. Halahan, who commanded the bluejackets, was amidships. The gangways were lowered, and scraped and rebounded upon the high parapet of the mole as *Vindictive* rolled; and the word for the assault had not yet been given when both leaders were killed, Colonel Elliot by a shell and Captain Halahan by the machine-gun fire which swept the decks. The same shell that killed Colonel Elliot also did fearful execution in the forward stokes mortar battery.

"The men were magnificent." Every officer bears the same testimony. The mere landing on the mole was a perilous business; it involved a passage across the crashing, splintering gangways, a drop over the parapet into the field of fire of the German machine-guns which swept its length, and a further drop of some 16 feet to the surface of the mole itself. Many were killed and more were wounded as they crowded up to the gangways; but

nothing hindered the orderly and speedy landing by every gangway. Lieutenant H. T. C. Walker had his arm carried away by a shell on the upper deck, and lay in the darkness while the storming parties trod him under. He was recognized and dragged aside by the commander. He raised his remaining arm in greeting. "Good luck to you," he called, as the rest of the stormers hastened by; "good luck!"

The lower deck was a shambles as the commander made the rounds of his ship; yet those wounded and dying raised themselves to cheer as he made his tour. The crew of the howitzer which was mounted forward had all been killed; a second crew was destroyed likewise; and even then a third crew was taking over the gun. In the stern cabin a firework expert who had never been to sea before—one of Captain Brock's employees—was steadily firing great illuminating rockets out of a scuttle to show up the lighthouse on the end of the mole to the block ships and their escort.

The *Daffodil*, after aiding to berth *Vindictive* should have proceeded to land her own men, but now Commander Carpenter ordered her to remain as she was, with her bows against *Vindictive's* quarter, pressing the latter ship into the mole. Normally, *Daffodil's* boilers develop 80 pounds pressure of steam per inch; but now, for this particular task, Artificer Engineer Sutton, in charge of them, maintained 160 pounds for the whole period that she was holding *Vindictive* to the mole. Her casualties, owing to her position during the fight, were small—one man killed and eight wounded, among them her commander, Lieutenant H. Campbell, who was struck in the right eye by a shell splinter.

Iris had troubles of her own. Her first attempts to make fast to the mole ahead of *Vindictive* failed, as her grappels were not large enough to span the parapet. Two officers, Lieut. Commander Bradford and Lieutenant Hawkins, climbed ashore and sat astride the parapet trying to make the grappels fast till each was killed and fell down between the ship and the wall. Commander Valentine Gibbs had both legs shot away, and died next morning. Lieutenant Spencer, R. N. R., though wounded, took command, and refused to be relieved. *Iris* was obliged at last to change her position, and fall in astern of *Vindictive*, and suffered very heavily from the fire. A single big shell plunged through the upper deck and burst below at a point where 56 marines were awaiting the order to go to the gangways. Forty-nine were killed, and the remaining seven wounded. Another shell in the ward-room, which was serving as sick-bay, killed four officers and 26 men. Her total casualties were eight officers and 69 men killed and three officers and 102 men wounded.

The storming and demolition parties upon the mole met with no resistance from the Germans other than the intense and unremitting fire. The geography of the great mole, with its railway line and its many buildings, hangars and store sheds, was already well known, and the demolition parties moved to their appointed work in perfect order. One after another the buildings burst into flame or split and crumbled as the dynamite went off. A bombing party working up towards the mole extension in search of the enemy destroyed several machine-gun emplacements, but not a single prisoner rewarded them. It appears that upon the approach of the ships, and with the opening of the fire, the enemy simply retired and contented themselves with bringing machine-guns to the shore end of the mole. And while they worked and destroyed, the covering party below the parapet could see in the harbor, by the light of the German star shells, the shapes of the block ships stealing in and out of their own smoke and making for the mouth of the canal.

Thetis came first, steaming into a tornado of shell from the great batteries ashore. All her crew, save a remnant who remained to steam her in and sink her, had already been taken off, but the remnant spared hands enough to keep her four guns going. It was hers to show the road to *Intrepid* and *Iphigenia*, who followed. She cleared the string of armed

barges which defends the channel from the tip of the mole, but had the ill-fortune to foul one of her propellers upon the net defence which flanks it on the shore side. The propeller gathered in the net and rendered her practically unmanageable; the shore batteries found her and pounded her unremittingly; she bumped into a bank, edged off and found herself in the channel again, still some hundreds of yards from the mouth of the canal, in a practically sinking condition. As she lay she signalled invaluable directions to the others, and here Commander R. S. Sneyd, D. S. O., accordingly blew the charges and sank her. A motor launch under Lieutenant H. Littleton, R. N. V. R., raced alongside and took off her crew. Her losses were five killed and five wounded.

Intrepid, smoking like a volcano and with all her guns blazing, followed; her motor launch had failed to get alongside outside the harbor, and she had men enough for anything. Straight into the canal she steered, her smoke blowing back from her into *Iphigenia's* eyes, so that the latter, blinded and going a little wild, rammed a dredger with a barge moored beside it which lay at the western arm of the canal. She got clear, though, and entered the canal pushing the barge before her. It was then that a shell hit the steam connections of her whistle, and the escape of steam which followed drove off some of the smoke and let her see what she was doing.

Lieutenant Stuart Bonham-Carter, commanding the *Intrepid*, placed the nose of his ship neatly on the mud of the western bank, ordered his crew away and blew up his ship by the switches in the chart-room. Four dull bumps was all that could be heard, and immediately afterwards there arrived on deck the engineer, who had been in the engine-room during the explosion, and reported that all was as it should be.

Lieutenant E. W. Billyard-Leake, commanding *Iphigenia*, beached her according to arrangement on the eastern side, blew her up, saw her drop nicely across the canal, and left her with her engines still going to hold her in position till she should have bedded well down on the bottom. According to the latest reports from air observation, the two old ships, with their holds full of concrete, are lying across the canal in a V position; and it is probable that the work they set out to do has been accomplished and that the canal is effectively blocked.

A motor-launch under Lieutenant P. T. Deane, R. N. V. R., had followed them in to bring away the crews, and waited farther up the canal towards the mouth against the western bank. Lieutenant Bonham-Carter, having sent away his boats, was reduced to a Carley float, an apparatus like an exaggerated lifebuoy with a floor or grating. Upon contact with the water it ignited a calcium flare, and he was adrift in the uncanny illumination with a German machine-gun a few hundred yards away giving him its undivided attention. What saved him was possibly the fact that the defunct *Intrepid* was still emitting huge clouds of smoke which it had been worth nobody's while to turn off. He managed to catch a rope as the motor-launch started, and was towed for a while till he was observed and taken on board.

Another officer jumped ashore and ran along the bank to the launch. A bullet from the machine-gun stung him as he ran, and when he arrived, charging down the bank out of the dark, he was received by a member of the launch's crew, who attacked him with a hammer.

The whole harbor was alive with small craft. As the motor-launch cleared the canal and came forth to the incessant geysers thrown up by shells, rescuers and rescued had a view of yet another phase of the attack. The shore end of the mole consists of a jetty, and here an old submarine, commanded by Lieutenant R. D. Sandford, R. N., loaded with explosives, was run in to the piles and touched off, her crew getting away in a boat to where the usual launch awaited them. Officers describe the explosion as the greatest they ever witnessed—a huge roaring spout of flame that tore the jetty in half and left a gap of over 100 feet. The claim of another launch to have sunk a torpedo-boat alongside the jetty is supported by many

observers, including officers of the *Vindictive*, who had seen her mast and funnel across the Mole and noticed them disappear.

Meantime the destroyers *North Star*, *Phæbe*, and *Warwick*, which guarded the *Vindictive* from action by enemy destroyers while she lay beside the mole, had their share in the battle. *North Star*—Lieut. Commander K. C. Helyar, R. N.—losing her way in the smoke, emerged to the light of the star shells, and was sunk. The German *communiqué* which states that only a few members of the crew could be saved by them is in this detail of an unusual accuracy; for the *Phæbe*—Lieut. Commander H. E. Gore-Langton, R. N.—came up under a heavy fire in time to rescue nearly all. Throughout the operation monitors and the siege guns in Flanders manned by the Royal Marine Artillery heavily bombarded the enemy's batteries.

The wind that blew back the smoke-screen at Zeebrugge served us even worse off Ostend, where that and nothing else prevented the success of an operation ably directed by Commodore Hubert Lynes, C. M. G. The coastal motor-boats had lit the approaches and the ends of the piers with calcium flares and made a smoke cloud which effectually hid the fact from the enemy. *Sirius* and *Brilliant* were already past the stream bank buoy when the wind changed, revealing the arrangements to the enemy, who extinguished the flares with gun-fire.

The *Sirius* was already in a sinking condition, when at length the two ships, having failed to find the entrance, grounded and were forced, therefore, to sink themselves at a point about 400 yards east of the piers, and their crews were taken off by motor-launches under Lieutenant K. R. Hoare, R. N. V. R., and Lieutenant R. Bourke, R. N. V. R.

The motor-launches here were under the command of Commander Hamilton Benn, R. N. V. R., D. S. O., M. P., while those at Zeebrugge were commanded by Captain R. Collins, R. N. (the vice admiral's flag captain). All the coastal motor-boats were commanded by Lieutenant A. P. Wellman, D. S. O., R. N. The torpedo-boat destroyer flotilla was commanded by Captain Wilfred Tomkinson, R. N.

The difficulty of the operations is to be gauged from the fact that from Zeebrugge to Ostend the enemy batteries number not less than 120 heavy guns, which can concentrate on retiring ships, during daylight, up to a distance of about 16 miles.—*London Times*.

ATTACK ON ZEEBRUGGE BASE DECLARED COMPLETE SUCCESS.—The Associated Press learns from a high naval source that the operations at Zeebrugge were a complete success, with the result that the Flanders flotilla now will be obliged to resort to the Ostend route in putting to sea, from which the British forces can more easily handle the German ships.

In addition to the damage done, the mole and the German guns, material and shipping, the channel has been blocked by the cement ships and a German dredger was destroyed.

The loss of the dredger, together with the blocking up of the channel, must result in the speedy silting up of the waterway, and it will take at least several weeks to clear the passage.

Reuter's Amsterdam correspondent sends the following telegram, received from Berlin:

"The Kaiser on Tuesday visited Zeebrugge, the scene of the frustrated English raid. He boarded the mole, where he convinced himself that the damage caused by the blowing up of the railway bridge had already been temporarily repaired and that a final bridging of the gap can be done in a few days. He also satisfied himself of the perfectly good condition of all the structures and installations on the outer part of the mole, which was the objective of the attack."

To Discipline German Admiral.—Vice Admiral Schroeder, the commander at Zeebrugge, according to reports reaching here, will be deprived of his command for being taken by surprise by the British Tuesday. Ger-

man newspapers, in commenting on raid at Zeebrugge, generally, take the hint given in the official reports at Berlin and represent the enterprise as having been a failure. Some, however, admit that the attack was made with great boldness.

The *Lokal Anzeiger* says that the raiders succeeded in blocking the waterway to a great extent, but that the U-boats still are able to leave their harbor, as a narrow passage remains.—*Evening Star*, 26/4.

SAYS AMERICANS PARTICIPATED IN ZEEBRUGGE RAID.—Scouting by American aviators of both the army and navy played an important part in the British raid on the German submarine base at Zeebrugge, according to an American naval officer who arrived at an Atlantic port aboard a French steamship yesterday.—*N. Y. Herald*, 8/5.

BRITISH LOST 588 IN RAID.—The total British casualties in the operations on Tuesday against Zeebrugge and Ostend were 588, according to an official announcement to-night. These were divided as follows:

Officers.—Killed, 16; died of wounds, 3; missing, 2; wounded, 29.

Men.—Killed, 144; died of wounds, 25; missing, 14; wounded, 355.—*N. Y. Herald*, 28/4.

STORY OF SINKING OLD "VINDICTIVE" AT OSTEND.—London, May 14.—The Admiralty has issued the following graphic story of the Ostend operation:

"Dunkirk, May 11.—The *Sirius* lies in the surf some 2000 yards east of the entrance to Ostend harbor, which she failed so gallantly to block, and when in the early hours of yesterday morning the *Vindictive* groped her way through the smoke screen and headed for the entrance it was as though the old fighting ship awoke and looked on.

"A coastal motor-boat had visited her and hung a flare in her slack and rusty rigging, and that eye of unsteady fire, paling in the blaze of star shells, or reddening through the drift of smoke, watched the whole great enterprise from the moment when it hung in doubt to its ultimate triumphant success.

"The planning and execution of that success had been intrusted by Vice Admiral Sir Robert Keyes to Commodore Hubert Lynes, who directed the previous attempt to block the harbor with the *Sirius* and *Brilliant*. Upon that occasion a combination of unforeseen and unforeseeable conditions had fought against him.

"Upon this the main problem was to secure the effect of a surprise attack upon an enemy who was clearly, from his ascertained dispositions, expecting him. The *Sirius* and *Brilliant* had been baffled by the displacement of the Stroom bank buoy, which marks the channel to the harbor entrance. But since then aerial reconnaissance had established that the Germans had removed the buoy altogether and that there now were no guiding marks of any kind. They also had cut gaps in the piers as a precaution against a landing, and, further, when toward midnight Thursday the ships moved from their anchorage, it was known that some nine German destroyers were out and were at large upon the coast.

"The solution of the problem is best indicated by the chronicle of events. It was a night that promised well for the enterprise—nearly windless—and what little breeze stirred came a point or so west of north. The sky was lead blue, faintly star-dotted, with no moon, and a still sea for small craft, motor-launches and coastal motor-boats, whose work was done close inshore.

"From the destroyer which served the commodore for a flagship, the remainder of the force were visible only as silhouettes of blackness—the destroyers looming like cruisers in the darkness, the motor-boats like destroyers and the coastal motor-boats showing themselves as racing hillocks of foam.

"From Dunkirk a sudden, brief flurry of gun-fire announced that German airplanes were about. They were actually on the way to visit Calais, and over the invisible coast of Flanders the summer lightning of restless artillery rose and fell monotonously.

"There's the *Vindictive*!" The muffled seamen and marines standing by the torpedo tubes and guns turned at that name to gaze at the great black ship, seen mistily through the screening smoke from the destroyers' funnels, plodding silently to her goal and end. Photographs had made familiar that high-sided profile, her tall funnels with Zeebrugge scars, always with the background of the pier at Dover, against which she lay to be fitted for her last task. Now was added to her the environment of night and sea and the greatness of the tragedy of her mission.

"She receded into the night astern, as a destroyer raced on to lay a light buoy that was to be her guide, and those on board saw her no more. She passed thence into the hands of the small craft whose mission was to guide her, light her and hide her in the clouds of a smoke screen.

"There was no preliminary bombardment of the harbor and batteries, as before the previous attempt. That was to be the first element in the surprise. A time table had been laid down for every stage of the operation, and the staff work beforehand even included precise orders for laying the smoke barrage, with plans calculated for every direction of the wind.

"Monitors anchored in firing positions far seaward awaited the signal. The great sea batteries of the Royal Marine Artillery in Flanders, among the largest guns that were ever placed on land mountings, stood by likewise to neutralize the big German artillery along the coast, and the airmen who were to collaborate with an aerial bombardment of the town, waited somewhere in the darkness overhead. Destroyers patrolled to seaward of the small craft.

"The *Vindictive*, always at that solemn gait of hers, found the flagship's light buoy and bore up for where a coastal motor-boat commanded by Lieutenant William R. Slayter was waiting by a calcium flare upon the old position of the Stroom bank buoy.

"Four minutes before she arrived there, and 15 minutes only before she was due at the harbor mouth, the signal for the guns to open was given. Two motor-boats under command of Lieutenant Albert L. Poland dashed in toward the ends of the high wooden piers and torpedoed them. There was a machine gun on the end of the western pier, and that vanished in a roar and leap of flames—which called to the guns.

"Over the town a flame suddenly appeared high in the air and sank slowly earthwards, the signal that the air-planes had seen and understood. Almost coincidentally with their first bombs came the first shells, whooping up from the monitors at sea. The surprise part of the attack was sprung. The surprise, despite the German's watchfulness, seems to have been complete. Up until the moment when the torpedoes of the motor-boats exploded there had not been a shot from the land—only occasional routine star shells.

"The motor-launches were doing their work magnificently. These pocket warships manned by officers and men of the Royal Naval Volunteer Reserve are specialists at smoke production. They built to either hand of the *Vindictive's* course the likeness of a dense sea mist, driving landward with the wind. Star shells paled and were lost as they sank in it; the beams of searchlights seemed to break off short upon its front. It blinded the observers in the great batteries, which suddenly, upon the warning of the explosions of guns, roared into action.

"There was a while of tremendous uproar. The coast about Ostend is ponderously equipped with batteries, each with a name known and identified as Von Tirpitz, Von Hindenberg, Deutschland, Cecilia and the rest. They register from six inches to monsters of 15-inch naval pieces in land turrets, and the Royal Marine Artillery fights a war-long duel with

them. These now opened fire into the smoke and over it at the monitors and marines, and the monitors replied.

"Meanwhile the airplanes were bombing methodically and anti-aircraft guns were searching the skies for them. Star shells spouted up and floated down, lighting the smoke banks with spreading green fires, and those strings of luminous green balls which the airmen called 'flaming onions' soared up, to lose themselves in the clouds.

"Through all this stridency and blaze of conflict the old *Vindictive*, still unhurrying, was walking the lighted waters toward the entrance. It was then that those on the destroyers became aware that what seemed to be merely smoke was wet and cold; that the rigging was beginning to drip, and that there were no longer any stars. A sea fog had come on.

"The destroyers had to turn on their lights and use their sirens to keep in touch with each other. The air attack was suspended and the *Vindictive*, with some distance yet to go, found herself in gross darkness. There were motor-boats on either side of her, escorting her to the entrance. These were supplied with what are called Dover flares, enormous lights capable of illuminating square miles of sea. At once every pistol was fired as a signal to light these, but the fog and smoke together were too dense for even the flares.

"The *Vindictive* then put her helm over and started to cruise to find the entrance. Twice she must have washed across, and at the third turn, upon reaching the position at which she first lost her way, there came a rift in the mist and she saw the entrance and the piers on either side and an opening dead ahead.

"The inevitable motor-boat, *U P 22*, commanded by Acting Lieutenant Guy L. Cockburn, raced on into the opening under heavy and momentarily growing fire and planted a flare on the water between the piers. The *Vindictive* steamed over it and on. She was in.

"The guns found her at once. She was hit every few seconds after she entered, her scarred hull broken afresh in a score of places, her decks and upper works swept by machine guns. The machine gun at the end of the western pier had been put out of action by a motor-boat's torpedo, but from other machine guns at the inshore end of the pier from a position on the front and from machine guns apparently firing over the eastern pier there converged upon her a hail of lead.

"After her control was demolished by a shell which killed all the occupants, including Sublieutenant Angus H. MacLachan, who was in command of it, the upper and lower bridges and the chart-room, swept by bullets, Commander Godsall ordered the officers to go with him in the conning-tower. They observed through the observation slit in the steel wall of the conning-tower that the eastern pier was breached some 200 yards from the seaward end as though at some time a ship had been in collision with it. They saw the front of the town silhouetted again and again in the light of the guns that blazed at them. The night was a patch-work of fire and darkness.

"Immediately after passing the breach in the pier Commander Godsall left the conning-tower and went on deck the better to watch the ship's movements. He chose a position and called in through the slit of the conning-tower his order to starboard the helm. The *Vindictive* responded and laid her battered nose to the eastern pier and prepared to swing her length across the channel.

"It was at that moment that a shell from the shore batteries struck the conning-tower. Lieutenant Sir John Alleyne and Lieutenant V. A. C. Crutchley were still within. Commander Godsall was close to the tower outside. Lieutenant Alleyne was stunned by the shock. Lieutenant Crutchley shouted through the slit to the commander, and, receiving no answer, rang for the port engine full speed astern to help the swinging ship. By this time she was lying at an angle of about 40 degrees to the pier and seemed to be hard fast, so it was impossible to bring her farther around.

"After working the engines some minutes to no effect, Lieutenant Crutchley gave the order to clear the engine room and abandon ship, according to the program previously laid down. Engineer Lieut. Commander William A. Bury, who was the last to leave the engine room, blew the main charges by a switch installed aft. Lieutenant Crutchley blew the auxiliary charges in the forward 6-inch magazine from the conning-tower.

"Those on board felt the old ship spring as the explosive tore the bottom plates and bulkheads from her. She sank about six feet and lay upon the bottom of the channel. Her work was done.

"It is to be presumed that Commander Godsall was killed by the shell which struck the conning-tower. Lieutenant Crutchley, searching the ship before he left her, failed to find his body or that of Sublieutenant MacLachlan in that wilderness of splintered wood and shattered steel. In the previous attempt to block the port Commander Godsall commanded the *Brilliant*, and together with all the officers of that ship and of the *Sirius* had volunteered at once for the further operation.

"Engineer Lieut. Commander Bury, who was severely wounded, and had been in the *Vindictive* in the attack on Zeebrugge mole. He had urged upon the vice admiral his claim to remain with her and with four engine-room artificers, in view of his and their special knowledge of her engines.

"The names of these four are A. Cavanagh, H. M. S. *Vindictive*, wounded; M. Carroll, royal naval barracks, Chatham, wounded; A. Thomas, H. M. S. *Lion*, missing; H. Harris, H. M. S. *Royal Sovereign*.

"The coxswain was a first-class petty officer, J. J. Reed, royal naval barracks, Chatham, who had been with Commander Godsall in the *Brilliant*, and whose urgent request that he be allowed to remain with him had been granted. The remainder of the crew were selected from a large number of volunteers from the ships of the Dover patrol.

Most of the casualties were incurred while the ship was being abandoned. The men behaved with just that cheery discipline and courage which distinguished them in the Zeebrugge raid. Petty Officer Reed found Lieutenant Alleyne in the conning-tower still unconscious, and carried him aft under a storm of fire from machine guns. Lieutenant Alleyne was badly hit before he could be got over the side and fell into the water. Here he managed to catch hold of a boat, and a motor-launch under Lieutenant Bourke succeeded in rescuing him and two other wounded men.

"The remainder of the crew were taken off by a motor-launch under Lieutenant Geoffrey H. Drummond under a fierce fire. When finally he reached the *Warwick* the launch was practically in a sinking condition; her bows were shot to pieces. Lieutenant Drummond himself was severely wounded. His second in command, Lieutenant Gordon Ross, and one hand were killed. A number of others were wounded. The launch was found too damaged to tow. Day was breaking and she and the *Warwick* were in easy range of the forts. As soon as her crew and the *Vindictive* survivors were transferred a demolition charge was placed in her engine room and she was sunk.

"All was according to program. Recall rockets for the small craft were fired from the flagship at 2.30 a. m. Great red rockets whizzed up, to lose themselves in the fog. They could not have been visible half a mile away, but the work was done and one by one the launches and motor-boats commenced to appear from the fog and stopped their engines alongside. The destroyers exchanged news with them. There were wounded men to be transferred and dead men to be reported. But no one had seen a single enemy craft. Nine German destroyers which were out, free to fight, had chosen the discreeter part.

"Vice Admiral Sir Roger Keyes was present at the operation on the destroyer *Warwick*. Commander Hamilton Benn, N. V. P., D. S. O., M. P., was in command of the motor-launches, and Lieutenant Francis

C. Harrison, R. N., D. S. O., was in charge of the coastal motor-boats. The central smoke screen was intrusted to Sublieutenant Humphrey V. Low and Sublieutenant Leslie R. Blake. The casualties, as at present reported, stand at two officers and six men killed; two officers and ten men, all of the *Vindictive*, missing and believed killed and four officers and eight men wounded.

"It is not claimed by the officers who carried out the operations that Ostend harbor is completely blocked. But its purpose to embarrass the enemy and make the harbor impracticable to any but small craft and for dredging operations difficult has been fully accomplished. The position of the *Vindictive* is with stem on to the eastern pier, and not her stern, as shown in certain published illustrations."—*Washington Evening Star*, 14/5.

BRITISH SUBMARINES HAVE TORPEDOED 40 HUN WARSHIPS.—*Two German Dreadnoughts Included in Official Review Received Here.*—More than 40 German warships have been attacked successfully by British submarines.

This was disclosed by an official British statement received here and made public to-day by the Committee on Public Information. The review was the most extensive ever received in this country of the work of the British under-water craft, concerning the activities of which little news has reached America since their famous raids in the Dardanelles and the Baltic Sea.

Most of the battles narrated in the review were with German destroyers which had sallied forth, presumably on raiding expeditions, but in one instance a submarine commander told of sighting four dreadnoughts of the *Kaiser* class off the Dutch coast and of discharging torpedoes at two of them. The submarine submerged as the torpedoes were fired, but from the sounds of explosions which the commander heard he concluded that two of the battleships were hit. The submarine was prevented by German destroyers from rising to the surface to observe the effects of its attack.—*N. Y. Herald*, 9/5.

GREAT MINE-FIELD IN NORTH SEA.—According to Archibald Hurd, in the London *Daily Telegraph*, the area in the North Sea, recently announced by the British Government as prohibited, as dangerous to shipping after May 15, will be the greatest mine-field ever laid for the special purpose of foiling submarines. It will embrace 121,782 square miles, the base forming a line between Norway and Scotland and the peak extending northward into the Arctic Circle.

Archibald Hurd, who is an authority on naval subjects, says that there has been a vast improvement in British mines since Admiral Jellicoe became First Sea Lord. Hurd points out that the creating of this barrier across the northern exit of the North Sea was an enormous task, involving 12 or more months, and estimates that tens of thousands of mines were required to cover the area. He suggests that when Admiral Jellicoe made his famous prophecy that the submarine menace would be met by August, that he had this mine-field in mind.—*Nautical Gazette*, 11/5.

GERMAN NAVAL ACTIVITIES.—No German war vessel larger than a destroyer has shown itself 150 miles west of Heligoland from August, 1916, to October, 1917, when two light cruisers attacked the Scandinavian convoy." That statement continues to present a picture of the state of affairs in the North Sea, although how soon it may be varied no one can attempt to predict. In spite of the strength of the High Seas Fleet, it is seldom indeed that any attempt is made to show the German flag in what was once called the "German Ocean," whereas at all times the British Fleet not only controls the communications in those waters, but sweeps them from end to end and right up to the enemy's mine-fields and the approaches to his fort-defended waters.—*Army and Navy Gazette*, 20/4.

U-BOAT AND MINE SINK SLOOP AND TRAWLER.—*Fifteen British Crew Men Missing. Eight Swedes Are Killed.*—London, May 12.—The Admiralty announces that a British mine-sweeping sloop was torpedoed and sunk by a German submarine, May 6. Two officers and 13 men are missing and are presumed to have been drowned.

A dispatch to the *Exchange Telegraph* from Copenhagen says the German mine-field north of Gothenburg has brought disaster to the large Swedish trawler *Agnes*, which struck a mine between Vingaa and Scalv. The trawler sank immediately. Eight Swedes on board were killed. Only two of the ship's company were saved.—*Evening Star*, 13/5.

SUBMARINES SUNK.—*Work of the R. N. A. S.—Attacks By Seaplanes.*—Instances of the successful work of the Royal Naval Air Service wherever our naval and military forces are operating were given in *The Times* of Saturday, and it is now possible to record some of the splendid services which this branch of our navy has rendered to the Empire by destroying enemy submarines.

While on patrol in the Channel, seaplane X sighted a submarine eight miles away, in the line of convoy which was about 10 miles off. When the seaplane reached bombing position, the top of the conning-tower was just awash, and both periscopes were out of the water. Two large bombs were released, the first of which exploded on the conning-tower, and the periscopes were seen to collapse. The second bomb hit the water 30 feet ahead of the conning-tower, in a direct line with the bow of the submarine. The seaplane then turned, and a considerable disturbance was seen on the surface—an upheaval of water, with quantities of air rushing up. Two other bombs were dropped from a height of 1000 feet, one of which exploded in the midst of the disturbance.

A Shoal of U-boats

One of our large seaplanes the other morning sighted an enemy submarine, painted light grey, with a mast and a gun on what appeared to be a raised deck. By the gun was one of the crew. Flying over the submarine, a bomb was dropped by the seaplane, and a hit was made on the tail of the vessel. Turning to repeat the attack, our airmen saw that the explosion had made a large rent in the deck, and this was photographed. At this moment gun flashes were seen some distance in front of the submarine, and through the mist came three more enemy submarines heading for the attacked vessel, escorted by three destroyers. All six vessels opened fire on our machine, but none of their shells was effective. Our seaplane again passed over the U-boat which was sinking by the stern, with the bow fully out of the water. A second bomb was released and exploded about 15 feet ahead of the bow of the submarine, causing her to sink immediately, leaving a quantity of blackish oil, air bubbles, and foreign matter on the surface. Our seaplane, having no further bombs, sent a wireless message explaining the position of the destroyers, and returned home in safety.

Two large seaplanes sighted an enemy submarine travelling about 14 knots. The first machine to reach her dropped a bomb, which exploded, and the submarine began to sink stern first, the bow rising high in the water. The second machine dropped a bomb which exploded immediately in front of the conning-tower. Another explosion occurred under water, followed by several smaller explosions. Two men were on the conning-tower as the vessel sank, but nothing more was seen of them.

Turned Turtle

Again, a seaplane and two aeroplanes on patrol saw a U-boat of very large type, with two periscopes. The submarine dived on hearing the aircraft's engines, but not before the seaplane had dropped two bombs, which fell just abaft the conning-tower, one seeming to be a direct hit. The

submarine turned upside down, and a large bubble, with wreckage, and large quantities of oil, subsequently appeared.

A patrolling airship noticed an attack by a submarine on a steamer, and flew down to the spot. By this time the submarine had submerged. Two bombs were dropped from the airship on the submerged vessel, and several bubbles, one of huge size, came to the surface. Two trawlers dropped depth charges, three of which exploded right over the target, and much oil came up.

A seaplane met a merchant ship and saw a large disturbance on the water 200 yards from the vessel. Then the wake of the torpedo was seen, but the torpedo missed the ship by a few yards. The seaplane, in less than a minute after sighting the U-boat's movements, dropped two bombs, which exploded within eight yards of each other. Large quantities of oil and bubbles rose to the surface; the merchantman proceeded on her course in safety.

An enemy submarine was sighted by two large seaplanes while on patrol. A bomb dropped by one of the seaplanes exploded just abaft the center of the submarine, which listed heavily to port, and went down by the stern within a minute.—*London Times*, 8/4.

BALTIC

GERMAN WARSHIPS ASSEMBLE AT KIEL.—The entire German Baltic fleet, except a few light cruisers, was recalled last week to Kiel, where important naval forces now are being concentrated, says a dispatch from Hamburg received in Geneva and transmitted by the correspondent of the *Daily Express*.—*N. Y. Herald*, 17/5.

BALTIC FLEET SAILS.—Petrograd, April 6.—The Russian warships have left Helsingfors for Kronstadt.

The Soviet Government has decided that the German landing concerns Finland only, and that the Soviet cannot interfere.

The newspapers state that the British Consul at Helsingfors has left for Petrograd.—*Reuter*.

Vasa, April 6.—It is announced that the "Red Guards" at Tammerfors have capitulated.—*Reuter*.

BRITISH SUBMARINES BLOWN UP BY CREWS AT HELSINGFORS.—All British submarines in the harbor of Helsingfors were destroyed when the German naval forces approached the city because it was impossible to get them away, owing to the fact that they were frozen fast, according to an Admiralty statement this evening. The submarines, which have been operating in the Baltic since the early part of the war, were blown up, together with their stocks of torpedoes, ammunition and other materials. Their crews have arrived in England, having traveled by way of Mourmansk.

The seven British submarines were destroyed during the five days from April 3 to April 8. The Admiralty says the project of blocking the harbor by sinking ships in it had been rejected by the Russian admiral commanding in chief.

The effect of the destruction of the British submarines upon the crews of merchant vessels was, however, the statement says, excellent and induced the destruction of many ships which would have fallen into the hands of the enemy.

"The guns at and near Hango," the Admiralty announcement says, "had already been dismantled, and upon the appearance of the German forces the Russians retreated from the vicinity after blowing up their four American submarines.

"Four British submarines of class E were taken outside the harbor of Helsingfors on April 3 and blown up and sunk. Three C-boats were demolished between that day and April 8. Their crews were removed to Petrograd.—*Evening Star*, 17/5.

RUSSIA'S FLEET IN THE BALTIC.—Within easy reach of the Hun lies the naval strength of Russia, a considerable force in ships of excellent design and modern construction which have been rendered completely defenceless by the demoralization of the personnel of the Russian Navy. The Germans have but to advance with land and naval forces from Reval and Helsingfors to Kronstadt and Petrograd to add to their navy four modern dreadnoughts, completed by the Russians since the outbreak of war, 30 modern destroyers of 34 knots speed and 10 modern submarines which were built in the United States and delivered to Russia since the outbreak of war. This is only the cream of the Russian naval strength, however, for Russia has in the Baltic something more than 100 destroyers of which, besides the 30 mentioned above, 20 are but about six years old; probably 15 submarines of 600 tons each in addition to her American built boats, and a number of cruisers, transports and smaller vessels of substantial value as a raiding force to an enemy who can gamble with them recklessly as can Germany.

Only the Ice Has Kept the Hun Away.—As late as the middle of April—the time of writing this article—press despatches told of the continued advance of German land forces on Russian soil. The Germans have not, however, advanced upon Petrograd nor have they attempted to steal the Russian warships and naval supplies at Kronstadt and Pootilof. Little has been said of the likelihood of their doing so. Yet it appears that the only thing that has held off the Hun from this theft is the ice that prevents the advance of his naval forces to Kronstadt. Certainly the Bolsheviki are powerless to prevent the theft. The one hope that remains to save these ships from the Hun is their destruction by Russians who are still determined not to give in to the enemy. The strong land fortifications that formerly barred the way to Kronstadt are now all in German hands and when the ice breaks the Germans have but to push forward to Kronstadt to take their spoil.

Will Their Crews Surrender Them?—It is possible that there are still Russians in the crews on board those warships who will blow up their ships rather than see them fall into the hands of the enemy. But this is only a possibility. If German propaganda has been as effective in Kronstadt as it has elsewhere in Russia it is probable, to say the least, that Germany will obtain possession of the Russian Baltic naval forces without difficulty.

Naval officers who were with the Baltic fleet as late as last November state that the four new Russian dreadnoughts are in good shape. They are new vessels and, although they have not been kept in repair, they have had practically no work and the Germans could easily and quickly put them in shape for action. The dreadnoughts are of 23,500 tons, mounting twelve 12-inch guns. They were laid down in 1909 as the first step toward the rehabilitation of the Russian Navy after the Russo-Japanese War and their guns were placed on board late in 1914.

While a gain of four dreadnoughts by Germany would not shift the preponderance of naval power in capital ships in favor of Germany against Great Britain, it must be borne in mind that the Germans are now staking everything on offensive operations and may reasonably be expected to risk a major naval engagement with the British fleet in a far more determined and genuine attack than they made at Jutland. Thus every capital ship added to the German forces must be considered as reducing the chances—for victory is never a certainty—of the British fleet to win. None of the belligerents have made public any information with regard to increases in naval strength since the outbreak of war. It is impossible, therefore, to state positively what is the German or British strength in capital ships. There have been many tales circulated of fabulous increases in German naval strength but, obviously, Germany has been devoting her resources largely to the construction of submarines. Likewise, Great Britain has been burdened with the construction of

merchant tonnage and with smaller types of warships to be used against German raiders. It is generally considered safe to presume that both Great Britain and Germany have completed, by now, all the dreadnoughts that were building at the outbreak of the war.

Making allowance for the British losses of two dreadnoughts, three battle cruisers and ten pre-dreadnoughts, and for the German losses of one battle cruiser and one pre-dreadnought, the British superiority in capital ship strength, on that basis, would now be about 16 dreadnoughts, three pre-dreadnoughts and one battle cruiser.

Thus the Russian Baltic strength, in dreadnoughts, represents about 25 per cent of the British superiority in that type of ship, and to have even a very safe margin reduced 25 per cent is a development of which serious notice must be taken.

But a possibly more serious development than that is the German gain in raiding strength—in destroyers and submarines. The Russian destroyer strength was always over-developed. It was far greater than our own destroyer strength at the outbreak of the war. The Germans are both under the necessity of employing raiding tactics and are in an excellent strategic position to do so, as we might as well frankly admit. To add a force of 30 modern 34-knot destroyers to the German Navy, plus the secondary Russian force of 20 six-year-old destroyers and 50 vessels of that type of older construction, gives the Germans an increased raiding strength which is indeed a serious matter for our allies and for ourselves. It is a force which the Germans can spend in any reckless venture to wear down the British naval strength and they may be counted upon to gamble with it if they are determined to seek a final issue on the seas.

Not only does Germany gain the Baltic submarine fleet, if she takes Kronstadt, but she obtains as well shipyards in which are facilities for the construction of 12 submarines. The Russians laid down 12 submarines every two years in the Baltic, but that was only the Russian peace time rate of construction and the Germans, with men and materials available, could of course turn them out with much greater speed. Fortunately, Russian raw materials would not be available for the Germans. Most of the raw materials for ship construction in Russia would have to be obtained from the territory that is controlled by General Kaledines and the Cossacks. The Germans could, however, ship raw materials by water from German Baltic ports to Petrograd. It is difficult to determine just what Germany would gain in the way of shipyard and ordnance construction facilities. It is said by Russian officers that there are large supplies of ammunition in stock which the Germans could take over. Shells for the dreadnoughts were provided, they say, which were never used. At Pootilof there is a naval gun factory which would fall into German hands at once.

Clearly this is a chance for gain in naval strength which it would be worth while for Germany to play for and to fight for. But she will not have to fight to get it. It is like a ripe fruit ready to drop into her lap. We have made much of the contribution our navy has made to the allied naval strength in the war zone. Unquestionably the work of the American ships has been excellent. Especially in destroyers—in the character of our ships and in the efficiency of their crews—the contribution of the American Navy to the allied forces is something of which every American can be proud. But we are concerned here only with the matter of the total strength in ships, and the fact is that the Russian naval strength which lies within such easy reach of the Hun is greater than the total strength of the 150 American warships of all types which the Secretary of the Navy has recently informed us are now with the allied forces on the other side.

Clearly the one inference allowed us is that the United States must increase its naval strength in the war zone to overcome any increase in

strength which Germany may score by taking over the Russian fleet. If there was a necessity, in the first instance, for sending these American warships into the war zone in order to increase allied strength, there is now an equal necessity to send enough more American vessels to keep the margin of superiority in naval strength where it is after the Germans take over the Russian ships.—*Sea Power*, May.

MEDITERRANEAN

A German submarine bombarded Kastelorizo, Island of Rhodes, off the coast of Asia Minor.—*Army and Navy Gazette*, 20/4.

DROVE OFF ENEMY U-BOAT.—Secretary Daniels has commended Elmer Dinnes Arnold, seaman, second class, United States Navy, armed guard detail, navy yard, New York, for the efficiency of the gun crew under his command on board the steamship *Chincha* when that vessel was attacked by a German submarine. This was the second time the *Chincha* had been attacked by a German submarine. After Arnold's gun crew had fired eight shots the submarine submerged.

Arnold enlisted at Indianapolis, Ind., September 8, 1915. Next of kin, Lillian Evans, sister, Carmel, Ind.—*Official Bulletin*, 13/5.

TEN DIE WHEN TORPEDO HITS FRENCH STEAMER.—Paris, May 17.—Ten passengers, one European and nine Arabs, were killed when the French steamer *Atlantique* was torpedoed in the Mediterranean early this month. The steamship managed to reach a port by her own means, it is announced. She measures 6447 tons.—*Evening Star*, 17/5.

BRIDGE OVER SUEZ IS NOW COMPLETED.—Cairo, Egypt, Thursday.—The swinging bridge over the Suez Canal at El Kantara, about 35 miles south of Port Said, has been completed. The bridge affords direct railway communication between Cairo and cities in Palestine.—*N. Y. Herald*, 17/5.

ADRIATIC

ALLIED POWER IN THE ADRIATIC.—“In the face of the preponderance in heavy ships which the Allies have at their disposal in or near the Adriatic,” says the London *Engineer* in an article in its issue of March 22 on the Italian battle fleet, “it was scarcely to be expected that the Austro-Hungarian fleet would choose to accept a pitched battle. Instead, their tactics have been confined almost entirely to raids by light forces against the unprotected Italian coast and the Allies' lines of communication in the Lower Adriatic. Against such tactics heavy armored ships are of no avail. The vessels of the greatest value in these circumstances are light cruisers and destroyers, and unfortunately the Italian Navy was inadequately supplied with vessels of both types. A number of modern destroyers and old torpedo gunboats have been fitted up as mine-layers, a branch of naval work in which the Italians have proved themselves remarkably efficient. The submarine flotilla includes about 30 boats, coastal and sea-going, the majority of which are of the well-known *Fiat-Laurenti* type, which has been adopted in many foreign navies. British and French officers who have served in the Adriatic theater have returned with the most favorable impressions of the quality of Italian naval material. The design of every ship is obviously the result of a careful study of contemporary principles in strategy and tactics, and betrays a certain independence of view not commonly met with in foreign naval circles.”—*Army and Navy Journal*, 30/4.

BRITISH WON SEA FIGHT IN ADRIATIC WITH SLIGHT LOSS.—In the engagement of allied and Austrian light sea forces in the Adriatic on

April 22 the British lost seven men killed and 19 wounded, the Admiralty reports. Two British destroyers, which for a time fought five Austrian destroyers, were damaged only slightly. (The official Austrian account of the engagement issued yesterday, said one British destroyer was damaged seriously.) The announcement follows:

"On April 22 five Austrian destroyers were encountered and engaged by two of our destroyers in the Adriatic. The enemy fled for shelter to the fortified port of Durazzo, pursued by our destroyers, which had been reinforced by five more British and one French destroyer. The chase continued until after midnight when touch with the enemy was lost.

"Our two destroyers, which engaged this very superior enemy force, received only minor damages. Our total casualties were seven killed and 19 wounded. It is not known what damage was sustained by the enemy.

"On the following day Durazzo was attacked by British air forces. The only man-of-war in the harbor was one gunboat. Our machines attacked the seaplane base, dropping nearly a ton of bombs, with apparently successful results. All our machines returned safely to their base."—*N. Y. Herald*, 28/4.

ITALIANS TORPEDO AUSTRIAN WARSHIP IN RAID ON POLA.—An Austrian battleship was torpedoed by Italian naval forces in Pola Harbor early Tuesday morning, it was officially announced to-day. The battleship was of the *Viribus Unitis* type.

The Italian force worked its way into the Austrian naval base by dodging the patrol boats and searchlights of the defenders.

While the naval operation was progressing an Italian seaplane force engaged Austrian battleplanes above Pola. Two of the Austrians were brought down and several others were compelled to descend out of control. The Italian machines all returned safely.

The text of the official announcement reads:

"Italian naval units, avoiding patrol boats and searchlights, succeeded in entering Pola Harbor early on Tuesday and in torpedoing an Austrian battleship of the *Viribus Unitis* type.

"Simultaneously Italian seaplane squadrons attacked Austrian battleplanes over Pola, brought down two and forced several others down out of control. The Italian machines all returned safely to their bases."

[There are four Austrian battleships of the *Viribus Unitis* class, which comprised the largest and most modern fighting vessels completed for the Austrian Navy up to the time the European war began. The other ships of the class are the *Tegetthof*, the *Prinz Eugen* and the *Szent Istvan*. The nameship was completed in October, 1912, and the others at intervals between then and the beginning of the war, with the exception of the *Szent Istvan*, which was not finished until 1915. Each battleship of the class displaces 20,000 tons, is 525 feet long over all, 89 feet beam and 28 feet draught. Their armament comprises twelve 12-inch and twelve 5.9-inch guns in the main battery, with eighteen 11-pounders and various smaller guns, and from two to six torpedo tubes. The complement of the battleships ranges from 962 to 988 men. All are heavily armored and are classed as dreadnoughts. The *Viribus Unitis* developed a speed of 20.9 knots on her trial trip.]—*N. Y. Herald*, 17/5.

ITALIAN WARSHIPS IN RAID AT DURAZZO SINK TWO VESSELS.—*Enemy Torpedo-Boat and Steamer Sent Down.—Airplanes Bomb Military Works.*—Rome, May 17.—Italian naval forces torpedoed and sank an enemy torpedo-boat and steamer at Durazzo, on the eastern coast of the Adriatic Sunday night, it was officially announced to-day.

Italian airplanes bombed and set fire to military works in Lisza and Durazzo Tuesday.

Lisza is on the island of that name north of Durazzo.—*Baltimore Evening Sun*, 17/5.

BLACK SEA

RUSSIA'S BLACK SEA FLEET.—The latest direct information available comes from naval officers who were with the Russian fleet in the Black Sea in October, 1917. At that time there were two dreadnoughts in the Black Sea fleet. These ships were completed since the outbreak of war and are in every way first-class ships and of excellent design. Three of them were built but one, the *Imperatriza Maria*, was sunk. The *Alexandra III* and the *Ekaterina II* which remain are ships of 22,500 tons, each mounting ten 12-inch guns. More attention should be paid to the older battleships and cruisers in the Black Sea fleet than we gave that type of vessel in the Baltic fleet because the ships of enemy navies against which the Black Sea fleet, in German hands, and the Turkish fleet would be matched would have more vessels of older types. The Black Sea fleet includes the *Ievstafi*, *Pantelimon* and *Ioan Zlatoust*, ships completed in 1906, of 12,800 tons and each with armament of four 12-inch guns and four 8-inch. There is also an old type battleship of 9000 tons, built in 1896, carrying four 10-inch guns and the *Tri Sviatitelia*, built in 1893 and carrying four 12-inch guns. Two protected cruisers, the *Kagoul* and the *Pamiat Merkooria*, are of 1903 vintage and carry twelve 6-inch guns. They are both 6700-ton vessels. Although the lists of 1914 give only nine new destroyers to the Black Sea fleet, I am informed that there are 14 such vessels at Sebastopol, all 33-knot ships. There are also four 600-ton, nine 350-ton and four 250-ton destroyers, all of about 25 knots speed. Nine new submarines were built for the Black Sea fleet since the outbreak of war and there are 13 old submarines, about 10 years old.

Turkey's Contribution.—If the Germans obtain possession of the Black Sea fleet they would, of course, combine it with the Turkish fleet and with the *Goeben* and the *Breslau*, the German cruisers now in Turkish waters. The *Goeben* was beached and injured. She was reported destroyed by the British but the Germans claimed to have floated her again and to have made her ready for action. She is a battle cruiser of 23,000 tons carrying 10 modern 50-caliber 11-inch guns, and of high speed.

To this fleet Turkey could contribute two dreadnoughts built in 1913, the *Sultan Osman I* and the *Sultan Mehmet Rechad V*, the former a 23,000-ton vessel with ten 13.5-inch guns and the latter a 27,500-ton ship carrying fourteen 12-inch guns. The Turks have two old battleships built in 1891 and a protected cruiser built in 1903 as well as a miscellaneous assortment of old cruisers and gunboats, not worth much. They have very little to offer in the way of destroyers.

But the total would make a considerable naval strength with five excellent capital ships as the backbone of the fleet. The Italian and French naval forces in the Mediterranean must keep the Austrians bottled up. The existence of such a German naval force in the Levant would threaten Greece, if it did no more, and would cost the Allies a considerable naval strength to guard against this danger. It is the necessity that the Allies face to protect so many miles of coast in such widely separated zone that makes their naval problem difficult. The Germans can concentrate and select the moment when they wish to strike, remaining safely protected by land fortifications meanwhile. But the Allies must be ever on the alert, watching two exits in the North Sea to guard against the approach of the German High Seas fleet; keeping the Austrian naval forces bottled within the Adriatic, the Turko-German forces within the Dardanelles and battling with the submarine all the time. Thus the creation of any hostile naval force that constitutes a continuing menace makes their problem more difficult and requires them to employ sufficient strength in ships and men to negative that force. If the enemy's strength in the Levant is increased, a further strain is placed upon allied forces in the Mediterranean and in turn upon their forces in the North Sea.

The American Navy is the only untouched reserve from which they can draw new strength to meet such a menace.

It would be more difficult—much more difficult—for the Germans to gain possession of the Russian Black Sea fleet. That fleet is now at Sevastopol and the Germans have no naval force with which to take it. Moreover, the morale of the Russians in the Black Sea fleet is somewhat better than in the Baltic and it is believed there would be a defence of that fleet. But it is a possibility—and I do not say that it is not a probability—that the Germans will capture the Black Sea fleet likewise. And so long as it is a probability or a possibility, we should now—not when it happens—take any necessary steps to guard against danger.—*Sea Power*, May.

BLACK SEA FLEET IN PERIL, RUSSIANS HEAR.—Mr. Tchitcherin, Bolshevik Foreign Minister, has asked Germany, according to the official news agency, to give a guarantee that the Russian Black Sea fleet, while remaining at Sebastopol, will not be seized or damaged by forces of the Central Powers and their allies now advancing into the Crimea, nor by any other naval or military forces of that alliance.

The Foreign Minister has taken this action, it is added, as he has heard that the Germans intend to blockade Sebastopol with submarines.—*N. Y. Herald*, 26/4.

PACIFIC

FIFTY-EIGHT IN "SEADLER" CREW INTERNED IN CHILE.—Fifty-eight of the crew of the German raider *Seeadler*, which operated in the South Pacific Ocean until it was wrecked, have been interned in Chile, according to an announcement to-day by naval authorities here.

The *Seeadler* sank a number of American vessels and was wrecked on an island in the Pacific. The crew was transferred to a captured vessel and continued their raids on commerce until they were captured.—*N. Y. Herald*, 20/4.

INTERNED SHIP BURNED.—*Prinz Eitel Friedrich Sinks at Anchor in Colombian Harbor*.—The German steamer *Prinz Eitel Friedrich*, which has been interned at Puerto Colombia, was burned and sunk at her anchorage there to-day.

The steamer was owned by the Hamburg-American Line and displaced 4650 tons.—*Baltimore Sun*, 28/4.

U-BOATS

TEN SUBMARINES SUNK BY AVIATORS.—Details concerning the destruction recently of ten German submarines by naval aircraft, eight by seaplanes and the others by dirigibles, have been obtained by the Associated Press from British Admiralty reports. The first case is described as follows:

"While on patrol in the English Channel a seaplane sighted a submarine eight miles away, directly in the path of an oncoming convoy of merchant ships. The seaplane dived at 90 miles an hour. The submarine attempted to escape by submerging, but was just awash as the seaplane reached a bombing position and released two bombs, one of which exploded on the conning-tower. The seaplane dropped two more bombs into the midst of the air bubbles from the collapsed submarine, which was of the largest type, carrying two guns."

The second case: "At dawn a seaplane sighted a large submarine on the surface, with a member of the crew standing by the gun. The seaplane dropped a bomb on the tail of the U-boat and afterward photographed the

sinking submarine, with a big hole in its deck. A second bomb was dropped close to the submarine's bow and the U-boat collapsed."

The third case: "Two seaplanes attacked a large submarine traveling on the surface at 14 knots, with two men in the conning-tower. A bomb was exploded close to the conning-tower, and the submarine began to sink stern first. A bomb from a second seaplane completed the work."

The fourth case: "Three patrol planes sighted a large submarine as it was submerging and dropped two bombs close to the conning-tower, causing the submarine to turn turtle and disappear in a mass of oil and wreckage."

The fifth case: "A seaplane sighted two submarines close to the surface and dropped two bombs. One bomb was ineffective, but the other hit the deck fairly amidships. The submarine was hidden by the smoke of the explosion, and when the smoke cleared the U-boat was sinking, with both ends in the air."

The sixth case: "A seaplane saw the track of a torpedo fired at a merchantman. It dived toward the shadow of the submarine, well below the surface. It dropped two bombs, which both exploded close to the submarine, resulting in a large quantity of oil, bubbles and wreckage."

The seventh case: "Two seaplanes sighted a U-boat on the surface and dropped a bomb each. The first bomb caused a heavy list to the U-boat, which began to sink by the stern. The second bomb exploded in the center of the swirl, demolishing the U-boat."

The eighth case: "A seaplane dropped a bomb on a submarine just emerging, and the U-boat disappeared with a heavy list to port. The pilot dropped a second bomb into the swirl, and a few minutes later a patch of oil 150 feet long and 12 feet wide appeared on the surface."

The ninth case: "A naval airship at midday sighted a suspicious patch of oil and circled it in an effort to ascertain the cause. Suddenly a periscope broke the surface in the midst of the oil. The airship dropped a bomb close to the periscope, and a series of bubbles began appearing, indicating that the damaged submarine was moving slowly away under the water. Several more bombs were dropped in the path indicated, until satisfactory evidence was obtained of the enemy's destruction."

The tenth case: "An airship dropped two bombs over a submarine which was engaged in attacking merchantmen. Great patches of oil and bubbles indicated severe damage, and trawlers made this complete by depth discharges."—*Flying, May.*

TORPEDOED U-BOATS.—Permission has been given by the British Admiralty to publish from its records the following details of further typical encounters with U-boats:

Motor launches were out on patrol when one of them detected a submarine under water. This was confirmed shortly afterwards by the two other boats, and appearances indicated that the submarine was zig-zagging. The hunters took up the chase, and it became obvious that the submarine realized she was being pursued and was stopping every time the launches stopped. So the game of blind man's buff went on till at last the launches had maneuvered into the desired position. Then they "laid their eggs." There were some under-water explosions, and a quantity of oil spread itself over the surface of the sea.

A submarine has been reported in a particular area, and it was pretty certain that she was lying on the bottom. The German would have to come to the surface to charge batteries, but as this proceeding would be highly dangerous for him in daylight, it was much more likely that he would attempt the operation by night. Accordingly a number of vessels were detailed to watch for him during the night in question. Luck was with the flotilla; the sea was very smooth, the night dark but clear, and the vessels engaged took up their appointed stations for the hunt. Between 1 and 2 a. m., one of the vessels "got a clue," and at once proceeded to the spot so as to be ready to welcome the U-boat directly he came to the sur-

face. Presently the German was sighted and fire was opened on him. He hastened to submerge, helped by a depth charge, after which nothing was heard of him.

A destroyer was escorting a convoy of merchantmen when she sighted the periscope of a submarine before the beam of the convoy and about half a mile away. The destroyer made haste to close, while the enemy quickly dived. A depth charge was dropped into the swirl caused by the German's disappearance, and the under-water explosion drove wreckage and portions of the submarine up to the surface. Just then another periscope was sighted, and a round was fired in its direction. This submarine fired a torpedo at the destroyer, but missed her and then submerged. Another destroyer engaged in escort duty sighted a periscope about two miles distant, and headed for the position. A depth charge was dropped in what was guessed to be the enemy's course, the German having dived, but with no apparent result. The destroyer continued her work, and at the end of an hour there came a dull and heavy under-water explosion. Then quantities of oil rose to the surface; but nothing more of the submarine was seen.

In the following terms the captain of one of our submarines described in his report how he sank an enemy vessel:

10 a. m.—Sighted hostile submarine; attacked same.

10.03 a. m.—Torpedoed submarine, hit with one torpedo amidships. Submarine seen to blow up and disappear. Surface to look for survivors. Put down immediately by destroyers, who fired at me.

By way of a note he adds: "During my attack there was just enough sea to make depth-keeping difficult. I fired two torpedoes, and one hit at forward end of conning-tower. A large column of yellow smoke, about one and a half times as high as the mast, was observed, and the submarine disappeared. The explosion was heard and felt in our own submarine. I proceeded four miles northward, and lay on the bottom. Many vessels throughout the day were heard in proximity. Several explosions were heard, especially one very heavy one. It must have been close, as the noise was considerably louder than that of the torpedo. On one occasion a wire-sweep scraped the whole length of the boat along my port side, and a vessel was heard to pass directly overhead."

After a chase lasting nearly two hours one of our submarines succeeded in sinking her quarry, an enemy submarine. The hostile vessel had evidently just come to the surface, as men were noticed on her bridge spreading the bridge screen. While maneuvering to attack, our submarine had to pass through shallow water, and as the sea was rough at the time, she frequently bumped the bottom heavily, but, fortunately, avoided breaking surface.

At a range of 550 yards both bow tubes were fired. On firing the periscope was dipped in case the boat rose, and the tube was brought to bear so as to be ready in the event of a miss with both tubes. Fifteen or twenty seconds after firing a dull report was heard.

On the periscope being raised, after a short interval, nothing was seen of the enemy submarine, but there was a great disturbance in the water where she had been. On proceeding to the spot where she was last seen, it was observed that the water was covered with an oily substance, which stuck to the glass of the periscope, obscuring vision. Although the vessel was not actually seen to sink there is little doubt that she was torpedoed, as it is improbable that she could have dived while steaming on the surface in the brief space during which the British submarine's periscope was lowered.—*Army and Navy Register*, 27/4.

JUST WHAT THE U-BOATS ARE DOING.—The failure of the German submarine to prevent the landing of American forces in France and food for the Allies is given by some observers as the real cause of the Hindenburg drive on the western front. It is generally conceded, remarks a writer

in the *New York Sun*, that the German Government timed the drive in the hope of getting a decision before the United States was able to throw its weight into the military scales on the side of the Entente. This is an admission that the U-boat campaign can no longer be relied upon to stop the flow of troops, provisions, and supplies from this country to Europe. As a further indication of the diminishing efficacy of the submarine, we have the low record of sinkings in the week ending April 7, when the U-boats' toll was four large and two small vessels. To say that the submarine menace has been brought fully under control would be foolish, remarks the *Atlanta Journal*, which thinks it will probably remain more or less of a menace to the end of the war. However, there is assurance in the fact that the stroke on which the Huns counted a year ago to win has been "broken to such an extent that they themselves now recognize how indecisive it is." A corroborating German opinion is found in the *Berlin Lokal Anzeiger*, whose navy expert, Captain Kühlwetter puts this question: "How is it that despite our submarines' work we hardly ever sink an American troop-transport, or when we do sink one we always find that only the ship is lost, whereas the troops whom we really want to destroy are always saved?" To his own question, Captain Kühlwetter gives this reply:

"American transports travel in convoys, well protected against attack, and are very fast. Thus the submarines have a most difficult and dangerous task. This is particularly true in the Channel, where the enemy can choose the most favorable hours of the day and can protect himself by all sorts of devices, mines, nets, etc.

"To try to seize the bull by the horns here would mean attacking a powerful enemy front, which can be broken more cheaply in other ways.

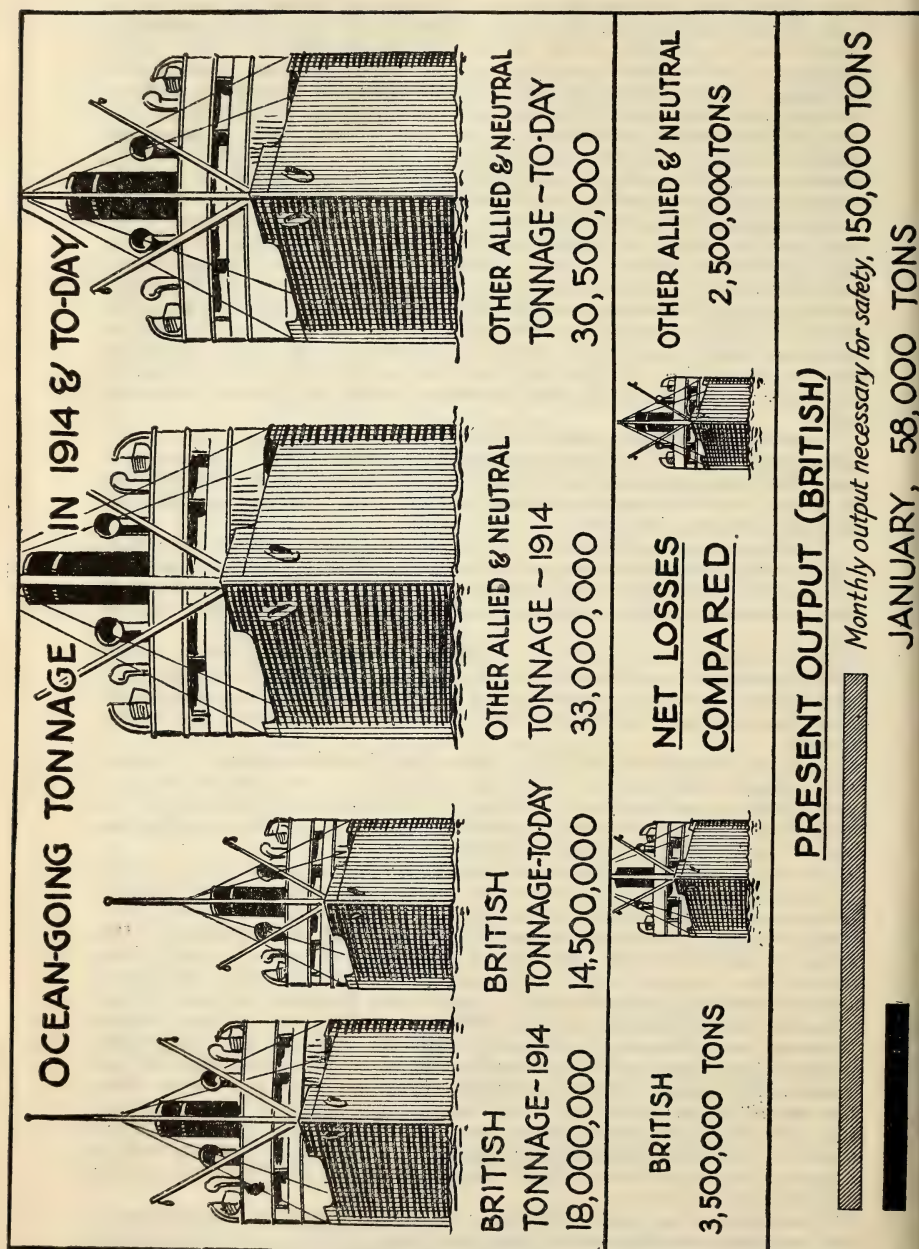
"In other waters the enemy defence is not quite so easy, but there he takes advantage of the great number of available harbors of disembarkation.

"It is not possible for us to have U-boats waiting off every enemy harbor until the transport can conveniently be destroyed. We have not got so many submarines. It would be wasting them and their precious crews, especially as if the ships were torpedoed the troops themselves would not be destroyed. . . .

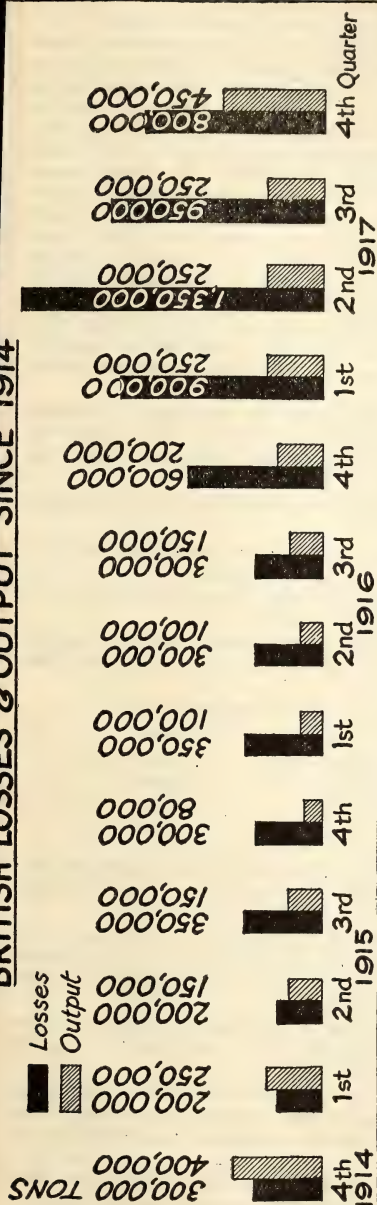
"It is not important for us to destroy the American troops. Hindenburg will take care of that. What we must destroy are tonnage and cargoes. Besides, we do not always hear of every transport we destroy. To make it our only aim to sink American transports would be sacrificing too many U-boats without perceptible results."

Vice Admiral von Capelle, too, seemed to think it was necessary to make an explanation of the submarine status to the Reichstag, and the *Brooklyn Citizen* sagely observes that if the great drive had turned out well, there would, of course, have been no need of making such an explanation. But it has not turned out well, and, in fact, is so much the reverse that "if the mind of the German people is allowed to dwell upon it, the very worst consequences may be anticipated." Amsterdam dispatches inform us that Vice Admiral von Capelle, German Minister of the Navy, declared before the main committee of the Reichstag that the new U-boat construction exceeded the losses and that the effectiveness of the submarines had increased. He quoted figures to prove his contention that the U-boat sinkings were "thrice or sixfold" the tonnage of the new British construction. As to the American destroyers, "which had been so much talked about," the minister claimed that they had failed in their object, and he is quoted by the semiofficial Wolff Bureau of Berlin with reference to our ship-building as follows:

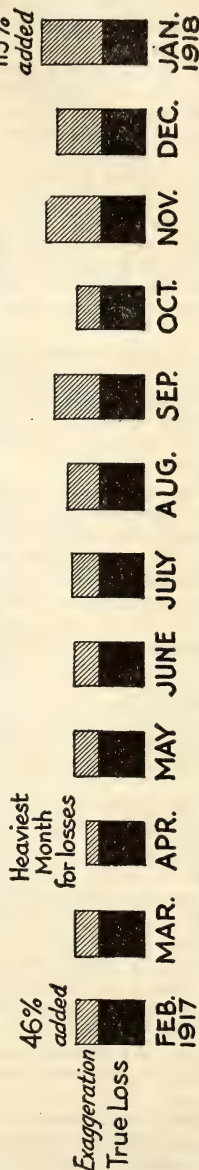
"For the carrying out of America's giant paper program America must first lay down the shipyards. After prodigious promises America in 1917 built 750,000 gross register tons of sea-going ships. The large mercantile fleet placed on order America does not want for the war, but the post-



BRITISH LOSSES & OUTPUT SINCE 1914



ENEMY EXAGGERATION OF LOSSES



PROPORTIONS OF LOSSES INFLECTED ON U-BOATS



THE WAR WITH THE U-BOATS; BRITISH ADMIRALTY FIGURES OF LOSSES AND GAINS.

GENERAL DRAFTING CO. INC. N.Y.

bellum period, when, the shipping program having been in the meantime carried out, America will become England's world freight-carrier."

Vice Admiral von Capelle admitted that Germany's opponents had some success with their antisubmarine measures, but averred that this success at no time had any decisive influence on the U-boat war, and according to human reckoning, would not in the future. As to our convoy system, he recognizes that it offers ships a certain protection, but it has the great disadvantage in his view of reducing the transport capabilities of the Allies. In replying to the utterances of von Capelle, the British Admiralty issued an official statement in which it is stated that "exaggerated figures of losses are still relied on by the enemy. The average of monthly losses of British ships in 1917 was 333,000 gross tons, whereas Admiral von Capelle bases his argument on over 600,000 tons." The figures quoted below show some trifling discrepancies from those in the diagram with this article; which are from another summary of the report of the British Admiralty. Sir Eric Geddes, First Lord of the Admiralty, spoke on the submarine situation in March in the House of Commons, and his speech, as summarized by the Parliamentary correspondent of the *London Times*, reads in part as follows:

"The world's tonnage from the beginning of the war until December 31, 1917, exclusive of enemy-owned tonnage, has fallen by a net figure of, roughly, 2,500,000 gross tons, that is, out of 33,000,000 estimated Allied and neutral ocean-going tonnage.

"The allied and neutral world has suffered about 8 per cent reduction in ocean-going tonnage.

"The percentage of net loss of British tonnage alone reaches 20 per cent. That represented 3,500,000 tons on a total of 18,000,000.

"At the present day, 47 large shipyards, containing 209 berths, are actually engaged on ocean-going merchant vessels.

"In the fourth quarter of 1914 the merchant tonnage produced in the United Kingdom was 420,000. In the fourth quarter of 1915 it had fallen to 92,000 tons.

"It then began to rise, as will be seen from the following table:

	1916	1917
First quarter	95,000 tons	246,000 tons
Second quarter	108,000 "	249,000 "
Third quarter	125,000 "	248,000 "
Fourth quarter	213,000 "	420,000 "

"In the fourth quarter of 1917 foreign construction was 512,000 tons, giving a total output for the world, excluding enemy countries, for that quarter of 932,000 tons.

"The loss due to enemy action and maritime risk for the last quarter of last year was 1,200,000 tons world's shipping. That was by far the lowest quarter of sinkings since the intensive submarine war began, and it looks as if this quarter is going to be lower still.

"By an increase in output and a decrease in sinking we reached in the last quarter of last year the position that the Allies were within 100,000 tons a month of making good the world's loss.

"Taking British loss and output alone, the proportionate deficiency is somewhat higher. We lost on an average 260,000 tons a month during the last quarter of 1917, and we built 140,000 tons a month—a deficiency of 120,000 tons.

"The increase in the average weekly output of repaired merchant tonnage in February, 1918, as compared with August, 1917, is 80 per cent, or 69 ships, representing 237,000 tons a week.

"In February we completed repairs to merchant craft at an average of 166 ships a week, representing more than 500,000 tons.

"We docked last year ten times the naval craft for repairs and refits which we dock in peace time. Over 3000 of these vessels were docked and refitted in the last quarter of last year.

"The additional men who have been put on to both merchant and war-ship repairs could have produced 500,000 tons of new merchant tonnage a year.

"During the last seven months the net addition to labor in private yards has been round about 18,000, mainly unskilled.

"Compared with January, there was in February a net increase on new construction, hulls, and machinery of over 2500, which is as much as the merchant yards can digest in the time with the skilled men available."

The *Philadelphia Press* says flatly that von Capelle had to justify his piratical work to the Reichstag committee, and he did it as well as he was able, but "in reporting secretly to the real masters of Germany, the military clique, he probably came nearer to the truth." This journal mentions the British Admiralty report above cited, and says that, thanks to its frankness, the fictitious figures of von Capelle can create no consternation in the anti-German world, for—

"We know that he lies when he says that from three to six times as many allied ships are being sunk as are being built. We know that he lies when he says that America is deliberately withholding the completion of her building program until after the war in pursuance of a mercenary design to wrest the commerce-carrying trade from England. And we suspect that he lies when he says that U-boat building in Germany has exceeded the rate of U-boat destruction, and that there is no difficulty in obtaining willing U-boat crews.

"The worst of the shipping situation was presented to the world last month in the following terms: Somewhat less than 12,000,000 gross tons of allied and neutral ships have been destroyed since the war began. New construction replaced more than 5,000,000 tons. The seizure of German ships added two and a half millions more. Thus the net deficit for the period of the war was calculated as 2,632,297 tons.

With every allowance for the vigor of the U-boat campaign, the *Press* goes on to say, as well as for the constantly improving methods of fighting it, it is probable that the submarine will sink as many ships this year as the British yards can turn out. Thus the American yards are called upon not only to make up the past deficit, but to fill the increasing tonnage requirements brought about by American participation in the war on a progressively larger scale and by the reduced effectiveness of common carriers due to the necessity of maintaining a transatlantic convoy system. The *Press* is convinced that Britain can hold her own against the U-boats, but it remains for America to achieve mastery over them, and "this fact is thoroughly understood at Washington, and the appointment of Mr. Schwab is a significant, if belated, recognition of its importance." The *Newark News* says of the Schwab appointment:

"Mr. Schwab, chosen for his present important post primarily for his success in relations with war-labor, his reputedly fair treatment of workmen, the results so far accomplished by him in a private capacity, bespeaks the sort of sympathetic understanding that will count. 'My place,' he says, 'is in the yards.' He wants every one connected with each yard to feel as he does—that nothing will be any good to any of us unless we win this war.

"Mr. Schwab knows, or should know, as well as any American business man, that it is no policy to rely on overconfidence. It is not to be presumed that he will make that mistake. Stimulation, purposeful direction of ship-building activities—in a word, ships—that is his job. To translate American desires into acts is the high privilege and imperative duty devolving upon him and upon every shipyard associate."

Testimony to the efficiency of the allied effectiveness against the U-boat is found in a dispatch from a French seaport in which Mr. James Kerney,

director for the Franco-American Committee of Public Information, is quoted as saying: "A French vice admiral told me that it was due to the great skill and cooperation of the American Navy that no tonnage has been lost on this coast for three months. He was most enthusiastic in his praise of Rear Admiral Wilson, who seems to have captured all this part of France. The depth bomb, listening device, and hydroaeroplanes in the hands of the Americans have conquered the submarines." Washington dispatches to various dailies disclose confidence among officials that the submarine menace is doomed, and in reply to the boast of Vice Admiral von Capelle that U-boat construction is exceeding losses, a correspondent of the Philadelphia *North American* cites navy officers as predicting that the menace will be wiped out by August, and perhaps by June. The *North American's* correspondent informs us further:

"Despite the vaunting passage in von Capelle's address that speaks of U-boat commanders so well trained that they manage to sink 'from three to four ships in succession belonging to the same convoys,' America has lost since the war began only 14 vessels, aggregating 75,000 tons.

"The outstanding facts in refutation of von Capelle's attempt to cheer the German people are these:

"The total neutral and allied tonnage is now approximately 42,000,000 tons;

"America will add this year at least 3,000,000 tons, possibly more than 4,000,000, according to some estimates;

"Great Britain will add at least 1,800,000 tons more, according to von Capelle's own admission;

"The total of other construction on the basis of 512,000 tons the last quarter of 1917, a conservative basis in view of winter-weather conditions, will amount to at least 2,048,000 tons, most of which will add to allied operations directly or indirectly.

"Japan already has agreed to build an additional 200,000 tons of shipping this year for America, and probably will build another 200,000.—*Literary Digest*, 4/5.

THE PERISCOPE.—It is a well-known fact that at a height of one foot from the water an object can be seen at 1.32 miles; at six feet elevation the range of vision is increased to 3.23 miles while at ten feet the horizon is increased to 4.16 miles. This in clear weather puts great limitations upon the sight of a submarine periscope, as all allied merchant vessels are keenly on the lookout for such. From the above it is also very evident that aircraft have extraordinary value in scouting for submarines, as at 25 feet elevation an object can be seen 6.59 miles away; at 100 feet, the range of vision is increased to 13.17 miles; at 500 feet, the line where sea and sky meet is 29.45 miles away.

At a mile high an aeroplane has a range of vision of 95.7 miles. At this height, with powerful telescopes, an aircraft can sweep an area of about 300 miles. In order to distinguish the camouflaged vessels of the Allies, the Germans have fitted their latest periscopes with ray filters, which clearly bring out the outlines of such otherwise invisible vessels.—*Marine Engineering and Naval Architect*.

SINKING OF U-BOATS IS STEADILY INCREASING.—London, May 8.—"The sinking of German submarines steadily increases," said Thomas MacNamara, parliamentary secretary to the Admiralty, in a speech at Bristol. He added that the destruction of merchant ships has fallen steadily month by month. The output of tonnage is now well ahead of that in 1917. The demand for immediate ship production on England is now large, however.

Mr. MacNamara declared that the big program made for England and America would take time to mature.—*Baltimore American*, 8/5.

THE PLUS AND MINUS OF U-BOAT WARFARE.—All of us who believe that the psychological war is as important if not more so than the war of arms,

will rejoice that the British Admiralty has decided to give, periodically, the full facts as to tonnage sunk and tonnage built among the allied nations. Certainly the first statement of this kind, as made by Sir Eric Geddes, is reassuring. The total of allied and neutral shipping losses, due to enemy action and marine risk in gross tons since the beginning of the war, is 11,827,572 tons. During that time, the Allies and neutrals built 6,606,275 tons of new shipping. Furthermore, there is a total of 2,589,000 tons of enemy vessels, either captured or taken over and brought into service. It follows that the net losses to the Allies and the neutrals up to the 1st of January, 1918, is 2,632,297 tons.—*Scientific American*, 27/4.

A BAD TIME UNTIL AUGUST.—Admiral Lord Jellicoe, in an address at Hull last month on the submarine situation, said that the reason losses by submarines in the Irish Sea were so heavy was because there was shoal water on each side of the sea, at the bottom of which "the submarines could lie for 48 hours at a time." When they "got a craft on to her the submarine would sit at the bottom until the trouble was over." He said that the difficulty of chasing the submarines into their own ports was that, for a radius of 150 miles around Heligoland Bight, the water was shoal and the submarines could sit at the bottom. At night a submarine could be seen at a distance of only 200 yards and the shoal area stretched for some 300 miles from Denmark to the Dutch Islands. "I am afraid," Lord Jellicoe said, "we are in for a bad time for a few months . . . but I have confidence that by about August we really shall be able to say the submarine menace is killed."—*Scientific American*, 27/4.

U-BOAT SINKINGS STILL EXCEED SHIP OUTPUT.—"During the year 1917 German submarines sank more than 10,000,000 dead-weight tons of shipping—11,000,000 would be nearer the truth"—said Bainbridge Colby, member of the United States Shipping Board, before a meeting of the Executive Committee of the Merchants and Manufacturers' Association to-day.

Last month, he said, the sinkings exceeded the combined tonnage built by Great Britain and the United States during that month. More than 11,050 large British steamers have been sunk since the war began.

"The submarines to-day," Mr. Colby continued, "are sinking ships faster than are built at present, and the only way to cope with the under-water assassins is to build ships with such a frenzy that the lanes of the ocean will be choked and the submarine pirates will be beaten. We must have ships. The submarines are still sinking more ships than are being built. Without ships we cannot send men, food or munitions to the other side. It is for our workmen, our employers to realize that we can, by their enlightened impulse, achieve that unity of purpose which will win for us."

As a result of this expansion of the havoc wrought by the German U-boats the committee unanimously adopted a resolution pledging its fullest support to the government ship-building program.

Holden Evans, President of the Baltimore Dry Dock and Shipbuilding Company, announced that they had laid the keel of a vessel yesterday which he promised would be launched in 50 days.

A White Paper, published March 22, 1918, placed the gross merchant tonnage lost in enemy action in 1917 at 6,623,623 tons, distributed as follows:

Period	British	Foreign	World's total
First quarter	911,840	707,533	1,619,373
Second quarter	1,361,870	875,064	2,236,934
Third quarter	952,938	541,535	1,494,473
Fourth quarter	782,889	489,954	1,272,843
Total	4,009,537	2,614,086	6,623,623

The same White Paper revealed the output to be as follows:

Period	British	Foreign	World's total
First quarter	246,239	282,200	528,439
Second quarter	249,331	377,109	626,440
Third quarter	248,283	368,170	616,453
Fourth quarter	419,621	512,402	932,023
Total	1,163,474	1,539,881	2,703,355

The net loss for the year was shown to be 3,920,268 tons; the net loss since August, 1914, 2,632,297 tons.—*N. Y. Times*, 4/5.

SUBMARINE SINKINGS REMAIN CONSTANT.—Recent Berlin advices are to the effect that 702,000 tons of shipping were destroyed by the submarines of the Central Powers in December, last. For the first 11 months of Germany's intensified submarine warfare, no less than 8,958,000 tons gross were sunk, it is claimed. Attention is called to the fact that the list of sinkings recorded in the last month of 1917 is noteworthy in several respects. The loss inflicted on the world's shipping was 100,000 tons greater than in November, and 30,000 tons more than in September and October. An attempt is also made to estimate the relative percentage of the total tonnage operating in the war zone sunk from month to month. In the following table, it is assumed that one-third of the tonnage available for the three blockaded countries, Great Britain, France, and Italy, is permanently in the war zone.

Month	Tonnage in war zone	Tonnage sunk	Per cent
February	8,217,000	781,500	9.5
March	8,125,000	885,000	10.9
April	7,958,000	1,091,000	13.7
May	7,817,000	869,000	11.1
June	7,667,000	1,016,000	13.5
July	7,508,000	811,000	10.8
August	7,367,000	808,000	10.9
September	7,200,000	672,000	9.2
October	7,058,000	607,000	9.5
November	6,900,000	607,000	8.8
December	6,733,000	702,000	10.4

How the tonnage operating in the war zone is estimated from month to month is not explained. According to the above figures, the tonnage in the war zone dropped from 8,217,000 tons to 6,733,000 tons between February and December last. This is a loss of 1,488,000 tons, or approximately 18 per cent. It would seem from this as though the Germans were willing to concede that in 11 months of ruthless submarine warfare they had only diminished the tonnage available for the Allies by one-fifth.—*Nautical Gazette*, 28/2.

U-BOATS HAVE MURDERED 14,120 NON-COMBATANTS.—There is a danger lest familiarity, even with such a monstrous crime as unrestricted U-boat warfare, should breed indifference to its enormity. Therefore, it is well to bear in mind that, except when the attack is made on fighting ships or transports carrying fighting men, the torpedoing of ships and sending men to their death far out at sea, is simply murder, unredeemed by any extenuating circumstances whatsoever. Just how great a bill of indictment is being drawn up by the German Admiralty against itself is seen in the statement given by the Government Leader in the House of Commons early last month, that up to February 5, 1918, the German U-boats had killed 14,120 non-combatant British men, women and children. This be it noted, is exclusive of the murders done upon peoples of other nationalities.—*Scientific American*, 9/5.

U-BOATS SUNK EXCEED THOSE BUILT.—Announcement from Paris that in the last three months more submarines have been sunk than have been built, bears out recent unofficial statements here on the submarine situation. It has been no secret that officials here have felt more encouraged within the last few months than at any time since the unrestricted submarine campaign began.

Merchant ship construction by the United States and the Allies already has passed the real danger point and ships are being launched faster than they are sunk. Officials pointed to this fact to-day as proof of the wisdom of the American policy of building an enormous merchant fleet.

As the supply of submersibles begins to diminish the biggest part of the shipping problem of the Allies begins to vanish. Aside from the general effect of a decrease in the number of submarines, officials look for it to have a decided effect on German morale. Every submarine sent to the bottom carries with it a trained crew, which is becoming increasingly harder to replace.

In February and April the number of submarines destroyed was three less than the total destroyed in the previous three months. These results, the minister declared, were due to the methodical character of the war against submarines; to close co-ordination of the allied navies; to the intrepidity and spirit animating the officers and crews of naval and aerial squadrons and to the intensification of the use of old methods and the employment of new ones.

"The situation is most favorable," the minister continued, "but it does not authorize the slackening of effort. It is necessary to redouble it, as the enemy has put new submersibles into service and is trying a fresh offensive, in which he plays his last stake."—*Washington Evening Star*, 13/5.

MILITARY

THE GERMAN PURPOSE.—"Their purpose is undoubtedly to make all the Slavic peoples, all the free and ambitious nations of the Baltic peninsula, all the lands that Turkey has dominated and misruled, subject to their will and ambition, and build upon that domination an empire of force upon which they fancy that they can erect an empire of gain and commercial supremacy—an empire as hostile to the Americas as to the Europe which it will overawe—an empire which will ultimately master Persia, India, and the peoples of the Far East. In such a program our ideals, the ideals of justice and humanity and liberty, the principle of the free self-determination of nations upon which all the modern world insists, can play no part. They are rejected for the ideals of power, for the principle that the strong must rule the weak; that trade must follow the flag, whether those to whom it is taken welcome it or not; that the peoples of the world are to be made subject to the patronage and overlordship of those who have the power to enforce it."—*The President's Baltimore address.—Notice to Mariners*, 20/4.

CHASED FROM EAST AFRICA.—*Germans Still in Flight, Pursued by British and Portuguese*.—London, April 27.—Reporting military operations in the East African battle zone, an official statement issued to-day by the War Office says that the advance of the British and Portuguese forces, which are pursuing the German troops, which crossed the German East African border into Mozambique, is proceeding under more favorable weather conditions. The text of the statement reads:

Since April 17 the convergent advance of General Northey and General Edwards' troops has proceeded under better weather conditions. The main enemy force is in the vicinity of Namungo. British and Portuguese troops are moving in the direction of Msalu River, while further south other British and Portuguese columns have been disposed north and south of the River Lurio.—*N. Y. Herald*, 28/4.

INTERNEED GERMANS OVERPOWER DUTCH GUARDS; 1000 FLEE.—*Report of Ultimatum to Holland Causes Uprising in Which Many Escape*.—Amsterdam, Sunday.—The report current last week that Germany had sent an ultimatum to Holland led to a revolt among Germans interned at the Vapanveld camp, according to a dispatch from Hattem, Holland, to the *Het Volk*.

The guards are said to have been overpowered by 1000 Germans, who fled in all directions. Frontier points were notified immediately and mounted police searched the countryside.

Many Germans succeeded in passing through Almelo or Hengelo on the way back to Germany, but the police rounded up the majority of them in groups of 25 or 50.—*Baltimore Evening Sun*, 27/4.

STRICTER WATCH BY DUTCH ON FOREIGNERS.—London, Saturday.—A bill introduced in the Dutch Parliament contains provisions for stricter supervision of foreigners resident in Holland during the present extraordinary war situation, according to a Reuter dispatch from The Hague. As it is considered that there are various objections to the expulsion of foreigners and as there may be undesirable elements among them, special regulations relative to them are believed to be necessary.—*Baltimore Evening Sun*, 27/4.

GENERAL BELIN HEADS VERSAILLES COUNCIL.—The Versailles Interallied War Committee, according to an official despatch from France, is henceforth to be constituted as follows: President, General Belin, France; members, General Sackville-West, for Great Britain; General Dirobilant, for Italy, and General Bliss for the United States.—*N. Y. Herald*, 23/4.

GERMAN PRISONERS TO WORK ON ROADS.—The War Department plans soon to offer to the states an opportunity to obtain as road builders German prisoners held in this country. Some of these men are already engaged in road construction in the vicinity of Forts McPherson and Oglethorpe, Ga., but the department intends to enlarge the scope of this and permit states to bid for their services.

States obtaining the prisoners must pay their maintenance, but the government will pay for guards, medical attendance and other incidentals, including a small amount of money for tobacco and the like.

Only Enlisted Men to Be Used.—Only enlisted men will come under the plan, for under The Hague conventions officers are exempt from manual labor.

At present this government is negotiating with Berlin through the Spanish representatives over questions of pay, so that there will be no inequality between the amounts Germany pays American officers and what we pay German officers.

The department has plans for supplying a distinctive uniform to the prisoners.

Some Want to Stay Here.—German prisoners like the United States and don't want to go back to Germany. It was learned to-day that some of them had secretly inquired from the War Department if they could remain in this country after the war and had expressed a dread of returning to the Fatherland.

The appeals carried the strong suggestion that the men were tired of Teuton militarism and pleased with American treatment and American freedom.

The War Department replied to their inquiries that it was unable now to announce a policy on that question. It is known, however, that the present plans are to return all prisoners to Germany when the struggle ends.—*Baltimore Evening Sun*, 22/4.

GIVES GERMAN REGULATIONS REGARDING REMITTANCES TO CIVIL AND MILITARY PRISONERS.—The War Department authorizes the following:

The following telegram has been received from the American minister at Berne, Switzerland, regarding regulations in force in Germany with respect to remittances from their home countries to interned civilians and prisoners of war:

"The Spanish ambassador at Berlin has transmitted a note dated February 15, 1918, from the German War Department, stating that there are no restrictions in regard to the remittance of money for civilian and military prisoners. The money sent is placed to the prisoner's credit, who may spend it freely with the following limitations:

"A. Military prisoners.

"1. Sixty marks weekly may be spent by officers and others of similar rank.

"2. Fifty marks weekly by non-commissioned officers and men.

"B. Civilian prisoners.

"1. Sixty marks weekly for men of better social position.

"2. Fifty marks weekly for others.

"With a view to obtaining particular articles, the prisoners are allowed at any time to draw on their credit."

No Guarantee of Delivery.—All moneys thus sent to interned civilians and prisoners of war should be remitted through the Bureau of Prisoners' Relief, American Red Cross, Washington, D. C. All money thus sent through the Red Cross should be remitted in the form of check or postal money order, payable to the American Red Cross. The information is imparted to all concerned that, while the American Red Cross has handled many such remittances and will be glad to handle all future remittances of a similar nature, no guarantee can be given as to the ultimate safe delivery of such remittances. It is also noted for the information of all concerned that remittances so made will probably not be delivered to addresses by the German Government in the form of cash, but rather in the form of credit on prison exchanges.—*Official Bulletin*, 29/4.

The British report of the action in the Struma Valley on April 16 shows that Greek troops did well, and reconquered several villages ceded to the Bulgarians under the old régime. To the north of the Greeks, British troops gained two villages to the southwest of Demir Hissar.—*London Times*, 18/4.

MR. WILSON'S GREAT STROKE.—By Arthur Pollen.—I doubt if the majority of English people really appreciate the full significance of what President Wilson, seemingly at the suggestion of General Pershing, has decided to do, not only with the American troops in France, but with all the troops that can be got to France in the immediate future.

The decision in itself is that the American battalions are to be brigaded as occasion requires with the French and British battalions, and to be sent into the firing line—of course, under their own colonels, majors, and company officers, but—as units controlled by French or British Brigadier-Generals of Division and so upwards. To many people, the President seems, in this, first to have done no more than meet a very clear necessity of the situation, and, secondly, only to be following a course for which he himself and the British Admiralty have already supplied precedents. As to the first point, I see it stated that there are in France a large number of American troops available for the purposes designated, a number which must very much exceed the total of the allied losses in the battle which still continues.

Of the timely value of this reinforcement there can be no two opinions. As to the second, a precedent for the principle involved has existed for several months in the case of the American destroyers operating in the Atlantic under the ultimate command of one of the most experienced and most brilliant of our senior admirals. They are, of course, only part of the forces at the disposal of this officer, and to make the analogy complete, Admiral Sims commanded the entire combined forces himself for a period.

This reciprocal action by the governments of the United States and Great Britain is, I believe, entirely without parallel in history. It has often happened that allied forces have worked together under a Generalissimo, but in each case every unit, and every individual in it, looked to the national commander-in-chief for orders. What was unique in this Anglo-American naval arrangement was that the captains and officers of English and American ships came under the direct orders of an officer not of their own nationality. Those who have been privileged to see at first hand how this arrangement has worked in practice have been deeply impressed by the skill and tact, no less than by the fine warlike and patriotic spirit which has alone made its complete success possible. And it is not a far-fetched idea to suppose that the real authors of President Wilson's epoch-making decision are Rear Admiral Sir Lewis Bayley, Vice Admiral Sims, and the officers and men of both nationalities who have served under them.

But, precedent or no precedent, the case of the army is in reality an infinitely more striking affair. For seamen are as a race apart. The long training and the sustained self-devotion necessary to gain mastery of a science and a craft incomprehensible to the lay segregate the sailor so completely from the landsman that when a common cause bids them unite forces, it is almost easier for English naval officers to feel the bond of brotherhood with American colleagues than with brother Englishmen not of their own high and select calling. The professional training of the soldier confers no parallel aloofness and, where you have the citizen soldier, there is almost no qualification of his purely national prejudices and characteristics. Without question, every American who volunteered for this war—and nine out of ten of those in France must be men who had gone into training before the draft came into force—did so to become a member of a purely American force, to fight under the Stars and Stripes for the credit and glory of his own country, to be commanded by American generals, and to be led and directed by an American staff.

To sacrifice so much of this ideal, to consent to so much of the merging of so much of the national identity—this would be extraordinary in any event. It approximates to the heroic in the case of a nation so singularly self-conscious of its nationality. The President has not, of course, by any means abandoned the building up of an American Army with its whole apparatus of generals, staff, and so forth. But the decision not to wait for the realization of this plan before enabling his ardent countrymen to strike a blow for justice and freedom, has necessarily postponed the army's creation, and to do this called for moral courage of a very high order. It is a thing that claims our sincere gratitude, and not the least of its many pleasing aspects is the very obvious satisfaction of the people of America with their President's decision.

Three months ago, in these columns, I offered my tribute to the unlimited willingness of the American people to make every effort and every sacrifice demanded of them for victory; but it did not occur to me that this particular demand would so soon be made. But circumstances have made it necessary, and great and unusual as the event is, those who realize that America's determination to fight and not stop fighting till victory is won, will not be surprised that the President has not hesitated to do what to a more narrow view of national dignity would have seemed prohibitive, or that the nation as a whole should have endorsed this finer vision with unanimous enthusiasm.—*Land and Water*, II/4.

MILITARY CRITIC ON NEXT PHASE OF THE GREAT BATTLE.—By Military Expert.—Just what Germany's plans for a renewal of the German offensive are no one can even make an intelligent guess. Her situation in the west is far from being comfortable and is one that cannot be maintained without a material change in the formation of her battleline.

To drive a salient into an enemy's lines is often an advantage if it is followed up by a widening process which gives the troops which occupy

it space in which to maneuver. But if it cannot be widened it is apt to be a source of extreme danger. This is the general situation which confronts the Germans both in the north and in the south. Whatever their plans must be, therefore, they must involve a widening of the bases of the two salients.

In the north the situation is peculiarly exacting by virtue of the depth of the wedge in relation to the short distance between the heels at the base. This is further aggravated by the topographical advantages which are against the Germans. Beginning at Messines Ridge and extending west, there is a long line of hill positions, all of which the Allies hold except the most easterly point at Kemmel Hill. Beginning at Vimy Ridge and extending northwest there is another ridge jutting out of the plains, all of which is in British hands. Between these two ridges are the Germans. They cannot advance at the point, as matters stand, since the further westward they go the sharper becomes the point of the wedge and the closer to its sides are the two ridges which eventually almost meet. The Germans cannot stand still, because they are down in the plain of French Flanders where every move they make is visible to the Allies on the northern bank of heights. It is impossible for them to make any concentrations of men or of guns, for, at the first attempts, they will come immediately under the fire of the British and French artillery on the heights.

On the southern leg of the salient the same situation exists. In fact, there is scarcely a point which from one side or the other does not come within the vision of the allied observation posts. Since, then, Germany cannot advance at the point and cannot remain where she is, there remains the problem of breaking through one of the sides and so extending the possible front of operation.

Fighting in the North.—The fighting which took place about this northern salient during the week was apparently designed to secure a local betterment of position, and, at the same time, to feel out the British strength at various points. The principal one of these attacks was on the Flanders front between La Clytte and Voormezele. The Germans in this attack used two divisions and, while the attacks on the two flanks of the front engaged were not pushed, that in the center continued for several days.

The main point of attack was about Vierstraat. This village is located near the tip of the spur which branches off from the main ridge between Messines and Kemmel toward the eastern side of Lake Dickebusch. It is limited on the north by Ridge Wood, a small clump of trees about which there has been the heaviest kind of fighting since the German offensive in Flanders began. The object of the Germans here was to push the British off this high ground down into the plain on the north. This would have represented a gain of but a few hundred yards, but it would have put the Germans further to the rear of the Mont Scherpenberg positions, which would in itself have placed them in a much better position for a subsequent attack when the offensive on a large scale reopened.

At the central point of the attack the Germans succeeded in forcing their way forward, but somewhat later a counter attack restored the British lines and the fighting ceased without result. Later another attack was delivered a little further west, just north of Kemmel. This attack passed through the same stages as did the first. There was an initial gain followed by a counter effort which restored the old positions, after which the fighting died down. The week's result is that, on this front, there has been no change in the situation.

Allies Gain in South.—In the south the initiative has been with the Allies during the whole week. The British have maintained a more or less consistent pressure against the German lines between the Somme and the Ancre and between the Somme and the Avre. The allied lines here have been pushed eastward somewhat and the positions bettered through obtaining a firmer grip on the various plateaus across which the lines run. The general situation, however, is much the same as it was last week.

The persistent inactivity of the last two weeks has in a measure left us completely in the dark as to just what is happening or is about to happen. The Germans, it would appear, had, as their greatest chance of success, speed in the attack, following up each blow with another, leaving no appreciable intermission between them. Delay, it was argued, would be fatal, as it would give the Allies a chance to dig in and make the German task much more difficult than it was when the offensive began.

There is, of course, an element of truth in this. Obviously the Allies can no longer be taken by surprise. The German attack, when it is resumed, must follow along the line of previous efforts, and be kept within the narrow limits fixed by the Germans themselves. It would not in any way further the consummation of their plans for them to strike in a new quarter. It would, indeed, be but a confession of their own weakness and an admission that their great offensive, which had been so widely advertised, was a failure. It is known, then, that the attack must come either in Flanders or along the Somme fronts. The situation in Flanders is well understood. The Germans must break through one or the other of the line of heights by which they are penned in.

Situation Around Amiens.—On the southern front the situation is much more simple, at least up to a certain point. Between the Ancre and the Noye Rivers, which territory is the vital sector of the southern part of the line, the country is very heavily rolling and is well cut up with streams of varying size, all, however, radiating to a common center—the Somme between Moreuil and Amiens. There is a series of angles formed by the various river junctions into which the Germans must go. They are astride all of the streams except the Noye River, a fact which, of course, operates in their favor, as the rivers cannot be considered as defensive barriers behind which the Allies, if forced to retreat, can take refuge. At the same time there is the disadvantage of inability to secure close co-operation between the various army groups into which the rivers divide the German line. The banks of all the streams in question have the same characteristics.

The ground rises very sharply from the banks until it reaches a plateau of considerable size, the plateaus being crossed by the battlelines, as these lines extend from north to south. There are, consequently, many good defensive positions to which retirement can be made if need be. The principal difficulty of the German position, however, is not the defensive position behind which the Allies can stand if driven out of their present lines, but the apparent advantage of being astride of the rivers.

In order to throw the Allies into the state of confusion necessary for a material advance in this section of the front, the Germans cannot content themselves with an advance into any single one of the angles between the rivers. To do this would merely create a number of sharp definitely limited salients, each of which would be a point of danger by reason of the fact that it could be practically ruined by artillery fire from all sides. And yet, to advance on a wide front, is an operation which requires the closest kind of co-operation between all units. It is difficult to see just how such co-operation is obtainable in a line divided into numerous parts by topographical obstacles. Nevertheless, it is consistently reported that the bulk of the German forces in France is concentrated on the Somme front between the Somme and Arras.

This is certainly a most important section of the line. Bitter fighting lasted about Bucquoy for many days. This fighting was designed to flank the defences of Arras—the heights of Notre Dame de Lorette and of Vimy. It is upon these defences that the British strength on the southern side of the Flanders front rests. This, therefore, would be a logical point of attack, as it would accomplish, if successful, the double object of widening both the Flanders salient and the front on the south. There has been no indication, however, other than the reported concentration of German divisions, that this is the section which is to receive the next German blow. It has, indeed, been the most quiet sector of all the long German front of attack.

There have been numerous bombardments along other parts of the line. In Flanders, at all points of the salient and particularly along the river Lys near where it divides the battleline, between the Somme and the Avre and along the Avre, there have been periods of heavy cannonading. But the section north of the Somme has been almost entirely free from molestation. But this is without any special significance, since, if the Germans intended to attack on this front, there would not necessarily be much artillery firing until the attack was about to be launched.

May Foe Attack in Italy?—There is the feeling in some quarters that the Germans, realizing that they are held fast on the front in France, are preparing a diversion from the real point of attack and are concentrating for an attack against Italy through the Trentino. This does not appear likely. It is entirely possible that an offensive against Italy may break out. But it is not probable that this will mean a cessation of the fighting in France. While the Germans have met with a check, and a very decided check at that, they have not yet been defeated by any means, but, on the contrary, still possess the ability to strike again and with practically the same strength as they did six weeks ago. They surely are not ready to acknowledge the defeat of their great effort to end the war.

To attack Italy at the expense of the front in France would be equivalent to such an acknowledgment. Germany cannot do both. In spite of the fact that practically all of her available forces are concentrated in the west, she has not sufficient strength to conduct two such offensives at the same time. She never has had. In every case where an offensive was in progress it was the signal for a period of quiet on the unaffected front. If Germany did not have the numerical strength to attack both Russia and the western allies at the same time, certainly now she has not enough men to initiate an offensive on the entire western front or at two parts of it so widely separated as are France and Italy. If, therefore, an attack against Italy is staged—and there have been indications that it is preparing—it will be conducted by the Austrians without any great assistance from Germany.

Cavalry in the Great Battle.—The relative inactivity during the past week affords an opportunity to mention a most interesting fact connected with the great battle which began on March 21. It has been generally assumed that the day of cavalry lapsed with the invention of the machine-gun and the airplane. We have heard little if anything of the cavalry arm since the early days of the war, when the movement of troops ceased to be rapid and degenerated, so to speak, into the dogged persistence of the trenches. General French was criticized on more than one occasion because he persisted in keeping intact a large cavalry force safely in rear of his army for which there was no apparent use.

But cavalry has been used in trench warfare, and most brilliantly used. The cavalry pursued the Germans in their retreat in the early part of 1917 and kept closely in touch with them during the whole of their retrograde movement. The cavalry operations in the back of Cambrai, both in the British attack and in the subsequent German attack, were among the most brilliant exploits of the war. And, in the present great battle, it was the cavalry of the French which maintained connection between the right flank of the British and the French left, and which in large measure prevented the Germans from accomplishing their object of dividing the two forces and rolling up the British line.

In the early days of this attack, it will be remembered, the Germans were pushing southward against the French, who were in retreat between Roye and Montdidier, while the British were retreating westward, north of this line. Here was the danger of the break in the continuity of the line. There was, indeed, a rupture, and for a time the German plan promised success. But the French cavalry stepped into the breach, re-established the connection, and fought both as mounted infantry and as a cavalry until reinforcements of infantry came up and took over the line. This

was really the turning point of the battle, as once a definite, positive connection between the two allied armies was made, the danger that the German attack would succeed ceased.

It was largely a question of mobility, and, in many of the battles of this war, just as in many in past wars, the great mobility of a cavalry force has been utilized in stiffening a vital section of a battleline where disaster threatened. Though the development of trench warfare has undoubtedly restricted the usefulness of cavalry, it must still remain an important military arm.—*New York Times*, 12/5.

OUTCOME OF GREAT BATTLE IN FRANCE HINGING ON MAN POWER; AMERICA MUST RUSH HELP, SAYS WAR DEPARTMENT REVIEW.—The War Department authorizes publication of the following review of military operations for the week ending April 27, 1918:

The outcome of the present operations in the west depends on man power.

The Germans are relying principally on rifles, machine-guns, man power, and carefully thought-out methods of transporting and supplying munitions to the front of attack under all conditions; which means that they have developed mobility of offensive action that can only be met by countermeasures of equal potency and flexibility.

A battle of such magnitude as the one being fought in the west cannot be decided by any single engagement, yet there arise a series of crises on which the ultimate outcome depends. These crises have up to the present in a large measure resulted favorably to the enemy.

The vigorous attacks driven against the British lines were intended to paralyze the independent will power of the British command. In this the enemy has failed. Unity of command of the Allies has extended operations to the broader field of general engagements in which all the allied forces will henceforth be used interchangeably.

This change in the combat situation has materially altered the moment of decision of the offensive. Instead of the enemy being able to defeat the British Army, and then turn its full energy against the French, the Allies are now able to oppose their full united strength to the hostile attack.

It must constantly be borne in mind that the enemy is seeking a decision that will end the war. This decision can only be arrived at by the destruction of the allied forces in the field before fresh units contributed from additional levies in France and Great Britain, as well as by our own troops, can take up their position in sufficient numbers to turn the German successes to defeat.

Ours is the imperative duty of providing replacement units for the armies in France. We must be able to put fresh men in the field thoroughly and methodically trained. In addition to those already called to the colors and now in training at our cantonments, or already selected for service, very large quotas will be required in the immediate future to fill the gaps.

Operations of the week reveal that the enemy, taking advantage of the reentering angles stretching from the Avre northward and from Wyt-schaete to Dranoutre, has resumed operations after a period of relative calm.

German Aims Clearly Defined.—It is not difficult to follow the strategic conception of the German higher command. An enveloping movement is outlined, which, on the one hand, is to force the retirement of the British from Arras, and, if wholly successful, result in the capture of both Arras and Amiens. On the other, by the occupation of the important heights of Kemmel to wipe out the Ypres salient and throw the British line back of Hazebrouck and Poperinghe.

In the south the thrusts toward Amiens have been well contained. The British are holding firmly in the face of furious assaults.

Hangard has been the scene of very violent engagements and the enemy is here pressing the attack with great vigor. Ailly-sur-Noye and the surrounding area have been subjected to very intense bombardments and Amiens itself is being consistently shelled.

Our own forces have taken part in the battle. American units are in action in the area east of Amiens. During the various engagements which have raged in this area they have acquitted themselves well.

In Flanders the situation is less satisfactory. Last week the Germans drove a strong thrust against the segment of the line held by the Belgians. This was well met and the enemy was unable to make any headway. After a delay, during which the Germans replaced their depleted units and brought up supplies and munitions, another principal assault was launched with Mount Kemmel as its objective. In the region from the Ypres-Comines Canal to Dranoutre violent fighting has again developed, as a result of which the enemy was able to capture Dranoutre, gain the summit of Kemmel, and reach Locre. Fighting continues in this area with unprecedented stubbornness and the advance of the enemy has not been definitely checked.

The loss of Mount Kemmel is a serious menace to the British dispositions in Flanders.

Along other sectors of the front there was relatively little activity. Rheims was again subjected to a very severe bombardment and the enemy launched several unsuccessful thrusts in this area.

Northwest of Toul enemy pressure is increasing. At dawn on the 21st, after a powerful preliminary barrage, the Germans launched a heavy raid against the sector held by our men.

On a frontage of approximately 3 kilometers, in the vicinity of Seicheprey, the enemy swept over our front lines. Our men were driven out of the village which the enemy was able to hold temporarily. During the night the Germans evacuated the positions captured and we were able to reoccupy our original front lines. Along the Meuse our troops beat off another raid.

Allied aircraft was particularly active and executed a large number of raids on depots and other points of importance in the Picardy and Flanders salients.

In the Italian theater no important change in the situation took place. Reports of the Austrian offensive, which may be undertaken in the near future, are noted. Along the Piave and Asiago Plateau artillery duels continued throughout the week and small local attacks were unsuccessfully attempted by the enemy at one of two points.

An Austrian detachment endeavoring to advance west of the Brenta was dispersed.

More important news reaches us from the eastern theater this week. British and French troops have landed at Murmansk, on the Arctic coast, and are assisting the Bolsheviki and Russian Red Guards in protecting the coast and Kola Railway from attacks by the White Guards. The White Guards, supported by the Germans, made an attempt to cut the railway near Kem. In southern Finland, the Finno-German forces are still making headway. Viborg is the only city now remaining in the hands of the Red Guards.

In Southern Russia.—In southern Russia, the enemy has occupied Perekop and has advanced southward into the Crimea, having occupied Simferopol, thereby gaining control of the railway which connects Sebastopol with the mainland of Russia.

In the Balkans considerable activity prevailed.

At Cerna Bend, enemy detachments attacked the Italian line but were forced to withdraw. General fighting has developed along the whole front. The allied forces executed a number of destructive raids, especially south of Dorian.

The most important engagement of the week took place in the region of the Mount Vetrenik. This height was stormed by Serbian units and, in spite of the formidable entrenched positions along the crest, was occupied by the Serbs.—*Official Bulletin*, 29/4.

GREAT ZEPPELIN PLANT AT FRIEDRICHSHAFEN REPORTED DESTROYED FROM AIR.—In addition to the destruction by fire of the German airplane plant at Manzell, reported several days ago, the Zeppelin factory at Friedrichshafen is said to have been burned down.

According to dispatches just received from Romanshorn, the fires were caused by aerial attacks, and 150 workmen were killed or injured.

The raiding airplanes were seen from the shore of Lake Constance as they flew northward over the lake after the attack.

The amount of damage is said to have been enormous.—*Baltimore Sun*, 21/4.

POWDER FACTORIES EXPLODE IN AUSTRIA.—German newspapers received at Zurich say that two large power factories at Glaserbach, near Salzburg, 156 miles southwest of Vienna, have been destroyed, according to a dispatch to the Exchange Telegraph Company from Switzerland. The explosions, which are believed to have been caused by incendiaries, are said to have resulted in heavy casualties.—*N. Y. Herald*, 25/4.

ONE BIG GUN BLOWN UP.—A description of the destruction by French artillery of one of the long-range cannon, with which the Germans have been bombarding Paris, is published to-day by the *Petit Parisien*.

"All the signs that Bertha (a French nickname for the big German guns, referring to Bertha Krupp), was going to fire had been noticed. The smoke curtain had gone up. All around there was a chorus of loud reports. Undoubtedly, Bertha and two or three hundred 70-millimeter naval guns were all firing simultaneously to disguise the whereabouts of the big cannon.

"After a short pause the firing was resumed. This time 10 naval guns supplied the obligato. French air observers were on the lookout, however, and French guns opened fire in their turn. The aviators signaled quickly that the result of the first salvo was most promising. Two heavy shells exploded 250 yards north of the big gun, tearing up the railroad tracks leading to the concrete gun platform. The firing was continued, getting closer and closer, until finally two enormous shells went through the camouflage. Two formidable explosions were heard and the discomfited Germans saw Bertha damaged beyond repair, with a rent 50 feet long in the barrel. The aviators reported that they could see plainly through the camouflage two gaping craters in the platform.

"French gunners then set about preparing to destroy the third Bertha, but thus far they have not succeeded, for shells arrived in Paris again during the small hours of the night."—*Baltimore Sun*, 28/4.

ITALIANS IN FRANCE, PREMIER ANNOUNCES.—Premier Orlando announced in the Chamber of Deputies that Italian troops would be despatched to the battle front in France.

The announcement, which was received with a storm of applause, was as follows:

"Italy, which follows with admiration the heroic efforts of the Anglo-French troops on the western front, could not remain absent from the battlefields of France. She wishes to bring to her allies tangible proof of solidarity, and very soon the colors of Italian regiments will fly over the fields of Picardy beside those of the French, British, American, Belgian and Portuguese, thus sealing the union which exists between the allied peoples and governments."—*N. Y. Herald*, 20/4.

MUNITION LOSSES VAST.—*But Churchill Says They Have All Been Made More Than Good.*—Winston Spencer Churchill, introducing in the House of Commons to-day the estimates for the Ministry of Munitions, of which he is the head, said that during the five weeks since the battle in France had opened they had been passing through the greatest strain, regarding the supply of war material, that had occurred in the experience of the ministry. Not only had the consumption and destruction of munitions of all kinds been proceeding at the greatest rate, but there were also very heavy losses by capture by the enemy.

"We lost," the minister said, "nearly 1000 guns by shell fire or capture; between 4000 and 5000 machine-guns have been lost or destroyed, and the quantity of ammunition, apart from that which has been fired and that which has been lost in the dumps, amounted to something between one and three weeks' total of manufacture.

"Other war materials have been used or lost in a great variety of classes and on a similar scale, but by the end of last week all the losses had been made good, and, in many cases, more than made good.

"Vast quantities of small arms ammunition have been lost or left behind, but great as the demand has been, the expenditure in the last month did not exceed the maximum potential capacity of the British factories, without touching enormous reserves which had accumulated against such a contingency. The wastage of rifles was very great, but the losses were quite easily and promptly made good.

"Our preparations had contemplated a period of supreme battle intensity from the third week of February instead of from the third week of March, so we are at present from one to three weeks to the good.

"In fact, barring unforeseen circumstances, our supply of munitions would enable us to carry on a battle at the supreme pitch of intensity until winter without compromising our requirement for 1919. This is despite the fact that 100,000 men were taken from munition factories for service in the army.

"We are making in a single week more airplanes than we made in the whole of 1914; in a single month more than we made in the whole of 1915; in three months more than we made in the whole of 1916. And we are going to make this year several times what we made last year."—*Baltimore Sun*, 26/4.

INDEX OF WAR VESSEL LOSSES MENTIONED IN THIS NUMBER

BRITISH VESSELS

1 minesweeper	1389
1 destroyer <i>North Star</i>	1383
1 submarine and	<i>Thetis</i> ....1380
6 old cruisers	<i>Intrepid</i> ..1380
sunk off Zee-	<i>Iphigenia</i> ..1380
brugge and	<i>Sirius</i> ....1380
Ostend	<i>Brilliant</i> ..1380
	<i>Vindictive</i> 1380
Destroyers	1369
7 submarines	1390

GERMAN VESSELS

10 trawlers	1377
Submarines	1297, 1371, 1389
Destroyer	1380

AUSTRIAN VESSELS

1 battleship (<i>Viribus Unitis</i>	
class)	1394
1 torpedo-boat	1394

UNITED STATES VESSELS

1 scout vessel No. 967.....	1372
1 transport <i>Zaanland</i>	1372

DIPLOMATIC NOTES

FROM APRIL 18 TO MAY 18

PREPARED BY

ALLAN WESTCOTT, PH. D., Instructor, U. S. Naval Academy

TEUTON PEACE OFFERS INSINCERE

CONQUEST AND EXPLOITATION IN GERMAN TERMS.—In an address in New York on May 18, President Wilson spoke as follows of the prosecution of the war and the emptiness of German peace offers:

There are two duties with which we are face to face. The first duty is to win the war. (Great applause.) And the second duty, that goes hand in hand with it, is to win it greatly and worthily (applause), showing the real quality of our power not only, but the real quality of our purpose and of ourselves. Of course, the first duty, the duty that we must keep in the foreground of our thought until it is accomplished, is to win the war. I have heard gentlemen recently say that we must get five million men ready. Why limit it to five million? (Great applause.)

I have asked the Congress of the United States to name no limit (applause) because the Congress intends, I am sure, as we all intend, that every ship that can carry men or supplies shall go laden upon every voyage with every man and every supply she can carry. (Applause.) And we are not to be diverted from the grim purpose of winning the war by any insincere approaches upon the subject of peace. I can say with a clear conscience that I have tested those intimations, and have found them insincere. (Applause.) I now recognize them for what they are, an opportunity to have a free hand, particularly in the East, to carry out purposes of conquest and exploitation.

Every proposal with regard to accommodation in the West involves a reservation with regard to the East. Now, so far as I am concerned, I intend to stand by Russia as well as France. The helpless and the friendless are the very ones that need friends and succor, and if any man in Germany thinks we are going to sacrifice anybody for our own sake, I tell them now they are mistaken. For the glory of this war, my fellow-citizens, so far as we are concerned, is that it is, perhaps for the first time in history, an unselfish war. (Applause.) I could not be proud to fight for a selfish purpose, but I can be proud to fight for mankind. (Applause.) If they wish peace let them come forward through accredited representatives and lay their terms on the table. (Applause.) We have laid ours and they know what they are. (Applause.)

MR. BALFOUR ON EMPEROR CHARLES' PEACE LETTER.—The true purport of the Emperor Charles' letter to Prince Sixtus, recently revealed by the French Government, was apparently an offer to France to abandon Italy, in return for which the Emperor suggested, whether honestly or not, that he would withdraw his support of Germany. As stated by Mr. Balfour in the House of Commons on May 16, the letter was sent with strict injunctions that it should be revealed only to France and Great Britain, and not to Italy or the United States. Mr. Balfour said further that "if any belligerent country desires seriously to lay before us any proposals, we are ready to listen to them," and "we are not going to deal with them without the recognizance of our allies."

Mr. Clemenceau, according to Mr. Balfour, had exposed the falsehood that the war was being waged in order that France might obtain Alsace-Lorraine while Italy should have no consideration. Mr. Balfour added that an extended Alsace-Lorraine was not a subject which should be considered seriously.

THE CENTRAL POWERS

MEETING OF EMPERORS STRENGTHENS GERMAN CONTROL.—On Sunday, May 12, the Emperor Charles, accompanied by Foreign Minister Burian, visited the Kaiser at the German Great Headquarters. While the nature of the agreements reached at this conference was not clearly revealed, it appears that in return for a free hand in Poland, Austria bound herself more closely to Germany for a period variously stated from 15 to 25 years. Referring to the conference, the German Chancellor, Count von Hertling, spoke as follows to the Berlin correspondent of the Budapest newspaper *Az Est*:

The new dual alliance will comprise two important sections, namely, economic and military agreements. The economic agreement of Germany and Austria-Hungary is not aimed at any state whatever. We are quite entitled to harmonize our common interests and act together. We desire to utilize the possibilities which this union, and nothing else, can give us.

With regard to the military side of the discussions I must emphasize that our agreements for the future have no aggressive character. We only desire consolidation of our present relations. We also desire to remain just as closely bound together after the war as during the war, which has drawn us together.—*N. Y. Times*, 19/5.

London, May 15.—Germany, in the course of the recent conference of Emperors William and Charles, agreed to the solution of the Polish question desired by Austria, on condition that Austria-Hungary conclude a 15 years' convention with Germany, according to a Vienna dispatch to the Berlin *Lokal-Anzeiger*, received in Amsterdam. Complete union between Austria-Hungary and Poland may shortly be expected, the message adds.

German newspapers say, according to an Exchange Telegraph dispatch from Copenhagen, that the Emperors selected monarchs for Lithuania, Courland, Esthonia, and Poland.

A Vienna dispatch to the Munich *Neueste Nachrichten* says that the new Austro-German alliance is fixed for a period of 20 years, includes a military convention, and provides for the closest economic and customs relations.

An official dispatch from Berlin received in Amsterdam to-day says that now that the main lines for the cementing of the alliance between Germany and Austria have been fixed, the political, military, and economic negotiations will doubtless begin shortly. It is obvious, adds the dispatch, that the political and military arrangements can be carried through faster than the economic, which will probably take several months to complete.

The phrase in the official report of the Emperors' conference regarding the consolidation and deepening of the alliance, says the Berlin *Tageblatt*, permits the assumption that the aim of the convention is a close military and political union and a complete blending of military resources.

CRISIS THREATENED IN AUSTRIA.—At the close of the week ending May 5, the Emperor Charles ordered the indefinite adjournment of the Austrian Parliament owing to Jugo-Slav and Czech agitation and inability of the government to curb parliamentary discussion. According to dispatches of

May 7, Premier Wekerle, head of the retiring Hungarian Ministry, was requested to form a new cabinet, and was given power, in case of failure to secure a parliamentary majority, to dissolve the Hungarian Parliament and either issue writs for a new election or post-pone elections until after the war.

The Socialist Vienna *Arbeiter Zeitung* turned strongly anti-imperialist and ridiculed the device of solving the crisis by proroguing Parliament. Reports from Germany of May 9 stated that this paper for two weeks had been barred from Germany.

Amsterdam, May 9.—Austria-Hungary, says one German journal, is "heading for disaster," while another declares that the country is going at ever-increasing speed toward a catastrophe. The *Kreuz Zeitung* says that Kaiser Charles' realm is "being shaken by a severe crisis, which this time goes far beyond parliamentary limits."

It is significant that the Vienna *Neue Freie Presse* is calling for energetic measures against the Southern Slav "menace," and that it views the political co-operation between the Southern Slavs and the Czechs with considerable alarm and as a danger to the monarchy. The tone of the article would suggest a situation on the southern confines of the dual monarchy infinitely more serious than is imagined by the public.—*N. Y. Times*, 10/5.

PRUSSIAN FRANCHISE REFORM HINDERED.—Reactionary elements in both the Upper and Lower Houses of the Prussian Parliament have adopted various devices to delay or emasculate the Franchise Reform measure approved by the Kaiser in his rescript of July last. A motion to restore the paragraph providing equal suffrage, which had been removed in committee, was twice defeated in the Lower House.

REFORM MOVEMENTS IN EUROPE.—With Prussian electoral reform hanging in the balance, a review of recent democratic progress in other parts of Europe shows how strikingly Germany will contrast with her neighbors if the clock is set back, not forward. We may put Russia to one side. Sweden has just seen the downfall of the Conservative Ministry because it would not consent to a revision of the constitution; the new ministry is a reform ministry, and the King's speech at the opening of the Riksdag, which included mention of woman suffrage and equality in the communal franchise, declared the necessity of "strengthening our people through extended political rights and far-sighted social reforms." During the war Denmark has completed the democratization of her constitution. In Holland universal suffrage has been adopted under a plan which at last separates the voters' roll from the tax roll. In Rumania, Premier Bratiano announced last May the government's decision in favor of universal suffrage and other reforms, and when peace is fully restored there is little doubt that just changes urged since the Congress of Berlin will be made. The struggle for universal suffrage in Hungary is steadily pushing the opposition back. Junkers like Count Spee may talk defiantly, but if they will only look outside their chamber they will realize—even thrusting the issue of the war out of consideration—what a Mrs. Partington rôle they play.—*N. Y. Nation*, 11/5.

SIGNIFICANCE OF THE LICHNOWSKY MEMORANDUM

In the summer of 1916 Prince Lichnowsky, German Ambassador to England from 1912 to 1914, prepared a secret memorandum giving his version of Anglo-German relations and negotiations up to the outbreak of war.

Several copies were prepared for private circulation, and by what the Prince later described as an "unprecedented breach of confidence" these reached a wider circle and fell into the hands of the Stockholm Socialist paper *Politiken*, which began their publication on March 15. A furious debate arose in the Reichstag next day, and before the close of the month much of the memorandum appeared in the Berlin *Vorwärts* and Münchner *Neueste Nachrichten*. The complete document appeared in the N. Y. *Times* of April 21 and in the May *Times Current History*.

Whether or not their publication in Germany at this time is contrary to the devious policy of the German Government, and if not what the motive for their publication may be, are matters for speculation. Efforts to overthrow the facts stated have at all events been feeble. The memorandum is undoubtedly the work of a German strongly favoring an understanding with Great Britain before the war, not fully in the secrets of the inner circle at Berlin, and humiliated and disgusted by the complete overthrow of his work in London. Incidentally, it should be noted that his Counsellor of the Embassy was von Kühlmann, the present Foreign Minister.

The memorandum almost completely substantiates the allied version of events preceding hostilities. It shows that Great Britain was on the point of concluding with Germany an agreement very favorable to Germany regarding the Bagdad Railway and Portuguese colonies in Africa; that Sir Edward Grey worked sincerely for peace throughout; and that "a hint from Berlin" would have led Austria to accept Serbia's reply.

Some of the striking statements in the memorandum are the following:

"We (the Germans) had always backed horses which it was evident would lose."

"Trade jealousy, so much talked about among us, rests on faulty judgment of circumstances."

"On Aug. 2 (1914), when I saw Asquith in order to make a final attempt, he was completely broken, and, although quite calm, tears ran down his face."

"Of course it would only have needed a hint from Berlin to make Count Berchtold (Austrian Foreign Minister in August, 1914) satisfy himself with a diplomatic success and put up with the Serbian reply."

"The impression became ever stronger that we (Germany) desired war in all circumstances."

"Thus ended my London mission. It was wrecked not by the perfidy of the British, but by the perfidy of our policy."

"I had to support in London a policy which I knew to be fallacious. I was punished for it, for it was a sin against the Holy Ghost."

"As appears from all official publications, without the facts being controverted by our own White Book, which, owing to its poverty and gaps, constitutes a grave self-accusation:

"1. We encouraged Count Berchtold to attack Serbia, although no German interest was involved, and the danger of a world war must have been known to us—whether we knew the text of the ultimatum is a question of complete indifference.

"2. In the days between July 23 and July 30, 1914, when M. Sazonoff emphatically declared that Russia could not tolerate an attack upon Serbia, we rejected the British proposals of mediation, although Serbia, under Russian and British pressure, had accepted almost the whole ultimatum, and although an agreement about the two points in question could easily have been reached, and Count Berchtold was even ready to satisfy himself with the Serbian reply.

"3. On July 30, when Count Berchtold wanted to give way, we, without Austria having been attacked, replied to Russia's mere mobilization by sending an ultimatum to St. Petersburg, and on July 31 we declared war on the Russians, although the Czar had pledged his word that as long as negotiations continued not a man should march—so that we deliberately destroyed the possibility of a peaceful settlement.

"In view of these indisputable facts, it is not surprising that the whole civilized world outside Germany attributes to us the sole guilt for the world war."

"And what result have we to expect from the struggle of people? The United States of Africa will be British, like the United States of America, Australia, and Oceania; and the Latin States of Europe, as I said years ago, will fall into the same relationship to the United Kingdom as the Latin sisters of America to the United States. They will be dominated by the Anglo-Saxon; France, exhausted by the war, will link herself still more closely to Great Britain. In the long run, Spain also will not resist.

"In Asia, the Russians and Japanese will expand with their limitations and their customs, and the South will remain to the British.

"The world will belong to the Anglo-Saxon, the Russian, and the Japanese, and the German will remain alone with Austria and Hungary. His sphere of power will be that of thought and trade, not that of the bureaucrats and the soldiers. The German appeared too late, and the world war has destroyed the last possibility of catching up the lost ground, of founding a Colonial Empire."

GERMAN CONTROL IN RUSSIA

GERMAN PRESSURE ON THE MOSCOW GOVERNMENT.—According to a London statement of May 12, the Russian Foreign Minister, M. Tchitcherine, had dispatched a wireless message to the Russian Ambassador in Berlin, M. Joffe, to "try to obtain from Berlin a cessation of every kind of hostility." Other messages assured Germany against hostilities on the part of the Russian Black Sea fleet, which was then at Novorossysk, on the east coast of the Black Sea; and protested against the closing of the Ukrainian frontier to Ukrainians.

Washington, May 14.—Secretary Lansing to-day received from American Minister Morris at Stockholm an unconfirmed Swedish report that Germany had served an ultimatum on the Soviet Government demanding, among other things, the occupation of Moscow and other large Russian cities.

"Swedish press reports from Moscow," said the dispatch, "state that Count von Mirbach recently transmitted to the Commissariat of the People a note formulated as an ultimatum and demanding the immediate effecting of certain financial measures which would practically make Russia a German colony.

"The chief points of the note were the immediate solution of the question regarding the exchange of prisoners, the complete abolishment of armaments, and the dissolution of units formed recently; also the occupation of Moscow and some other large Russian cities."

No confirmation of this report, however, has been received by the State Department through any official source.—*N. Y. Times*, 15/5.

This report was in some measure confirmed by dispatches of May 16 to the effect that Russians were disposing of securities, bonds, control of financial institutions, etc., to Germans at bargain prices.

LITHUANIAN "INDEPENDENCE".—Amsterdam, May 14.—Emperor William has issued a proclamation concerning Lithuania in which he says it is assumed Lithuania will participate in the war burdens of Germany. The

"independence" of Lithuania, allied with the German Empire, is recognized.

The proclamation, according to the *Rheinische Westfälische Zeitung*, carries the following preamble:

"We, Wilhelm, by God's grace, German Emperor, King of Prussia, etc., hereby make known that whereas the Lithuanian Landsrat, as the recognized representative of the Lithuanian people, on Dec. 12 announced the restoration of Lithuania as an independent state allied to the German Empire by an eternal, steadfast alliance, and by conventions chiefly regarding military matters, traffic, customs, and coinage, and solicited the help of the German Empire: and,

"Whereas, Further previous political connections in Lithuania are dissolved, we command our Imperial Chancellor to declare Lithuania on the basis of the aforementioned declarations of the Lithuanian Landsrat, in the name of the German Empire, as a free and independent state, and we are prepared to accord the Lithuanian State the solicited help and assistance in its restoration,

"We assume the conventions to be concluded will take the interests of the German Empire to account equally with those of Lithuania and that Lithuania will participate in the war burdens of Germany, which secured her liberation."

Washington, May 14.—Emperor William's proclamation was received to-day with no enthusiasm by officers at the Lithuanian National Council headquarters here.

"The assumption that Lithuania 'will participate in the war burdens of Germany' means a contribution of three things—money, munitions, and men," the officers declared. "The first we have not, as Germany has already impoverished us; the second we have no means of supplying, because we lack the first. Therefore Germany can have reference only to men. Men from a self-declared democracy to fight in the ranks of autocracy? Unthinkable! Lithuania would not consent. Are her citizens to be dragooned into the ranks of the Kaiser? That would be an abridgement of the sovereignty which Germany has already recognized, for Chancellor Hertling's reply stated. 'We hereby recognize Lithuania as free and independent.'"—*N. Y. Times*, 15/5.

REPUDIATES GERMAN RULE.—Washington, April 20.—The Provisional Government of Esthonia has published a protest against the recent German intrigue in that country, according to an official dispatch from France to-day, and has denounced the Diet of Livonia, Esthonia and Riga, which asked for a union with Prussia.

The protest is quoted by the dispatch in part as follows:

"As delegates of the Provisional Government of the Esthonian republic, we declare that the resolution is a falsification of the opinion of the Esthonian nation and can only be the expression of an insignificant minority composed of the German nobility and their partisans. The representatives of the Esthonian nation were not present at the assembly, having been replaced by substitutes of Esthonian origin, but deprived of all authority and not enjoying the confidence of the majority of the population, as well as by other elements and other persons introduced by the German military authorities."

The protest concludes, the dispatch said, with the assertion that the majority of the Esthonian nation would never submit to the decisions of the Diet of Riga, which it repudiates as worthless and illegal.—*Baltimore Sun*, 21/4.

LORD CECIL ON GERMAN PLANS.—London, May 3.—Lord Robert Cecil discussed to-day the expected German peace offensive, and said that he looked for it as part of their regular war plan.

"It will be meant mainly for internal consumption," he said. "Of course, it has proved futile to prophesy in this war, but I believe that the German

general plan is, supposing that they cannot win a decisive victory over the Allies, to go on fighting in the West until they have acquired complete commercial hold over the East. If they once really establish themselves in Russia, there is no reason why they should not fight the whole world forever."

Asked if he included in the German plans the use of Russia's man power, Lord Robert said that he did not expect that immediately, but it might come later. He went on to say that these grandiose plans depended on many things, and the German Government's great object in launching a peace offensive at this time was to induce its own people to carry on from week to week and month to month, in the belief that peace was almost in sight, until its Russian plans were matured. He continued:

"The peace offensive, I believe, will be directed very largely against England. They will put out offers which they think will be attractive to this country."

He then explained his idea of the German tactics. First, there was in the German newspapers a great outburst of Pan-Germanism, which was permitted, if not encouraged, by the government. Then, when the German peace offers are made, perhaps to England, they will be so much less than what the Pan-Germans have claimed that the government will be able to appeal to its people to admire its moderation. Meanwhile, in case something might come of its move, it has permitted the circulation of the Lichnowsky memorandum and has paid official tribute to the bravery of the British troops, to lessen the bitterness of feeling against England."—*N. Y. Times*, 4/5.

GERMANY OVERTHROWS UKRAINIAN RADA.—While events in Ukraine have not been fully reported, it appears that on April 25, the German authorities, under cover of a so-called revolt, dissolved the Ukrainian Central Rada, arrested and searched many members of the Rada and the Ukrainian Cabinet, and on the next day set up a new government completely under German control. This government was headed by a Russian named Skoropadski, who proclaimed himself "Hetman" with supreme power and formed a ministry of former bourgeois politicians favoring Germany as against the Bolsheviks. Skoropadski had formerly been a page to the Dowager Empress Marie Feodorovna, and it was later reported that she and the Grand Duke Dmitri Pavlovitch took part in the coup d'état and had arrived at Kiev. General von Eichorn, the German military authority, proclaimed military rule and continued arrests of those opposed to the new government.

Correspondents opposed to Bolshevik rule in Russia inclined to a favorable view of the patriotism of the new cabinet. On the other hand Mr. Arthur Ransome wrote on May 9 as follows:

"According to my information, Skoropadski, before the beginning of the negotiations with Great Russia, will invite her representatives to change the present government, meaning thereby probably not merely a change of persons but of the general political coloring of the ministry."

Should this be so, it will be yet another proof that the interests of the Allies coincide with those of the Soviet Government.

The official *Izvestia* says:

"Each new act of the German Government in connection with Russia merely deepens the gulf between Germany and her eastern neighbors. The German military party is preparing for itself irreconcilable enemies in the East and not making friends in the West."

I believe that is absolutely true, and that Germany, step by step, is increasing her own difficulties in Ukraine. The bourgeois Rada, for example, had guaranteed by the peace agreement to supply 30,000,000 poods of corn to

the Central Powers before May 1. Owing to the passive and sometimes active resistance of the peasants they succeeded in only supplying 3,000,000. That is to say, that for the betrayal of the Russian revolution the German people so far have received less than 1 pound of flour all round.

Later lists of the ministers of the cabinet of the autocratic Hetman differ in detail from the list cabled Tuesday, but the main characteristic of all lists is the same. It is made up of cadets and members of political groups even further right. It is committed to a germanophile policy.

The German declaration asserts that the Rada had no base of popular support and no authority, since its was unable to free the banker Dobry, who was arrested by an anti-German society. The Germans promise to give all possible support to Skoropadski against revolts, which they evidently consider probable.—*N. Y. Times*, 11/5.

RUMANIAN PEACE TREATY

RUMANIAN PEACE TREATY SIGNED.—The peace treaty between Rumania and the Central Powers, to be called the "Peace of Bucharest," was signed on May 6. By the treaty Rumania concedes to Austria "frontier rectifications" requiring the cession of some 3000 square miles of territory on the Transylvanian border, control of the Danube by the Central Powers along its entire length, cession to Bulgaria of all the Dobrudja gained by the treaty of Bucharest in 1913, and German control over Rumanian oil fields.

A summary of the treaty follows:

Clause 1.—Re-establishment of Peace and Friendship.—Germany, Austria-Hungary, Bulgaria and Turkey, on the one hand, and Rumania on the other, declare the state of war ended and that the contracting parties are determined henceforth to live together in peace and friendship.

Diplomatic and consular relations between the contracting parties will be resumed immediately after the ratification of the peace treaty. The admission of consuls will be reserved for a future agreement.

The remaining clauses may be summarized as follows:

Clause 2.—Demobilization of the Rumanian Forces.—The Rumanian Army, except four divisions in Bessarabia, to be reduced to a peace basis; surplus munitions and guns to be guarded by Rumanian troops under supervision of the allied (German) command; naval forces to be reduced to a peace basis, after a settlement in Bessarabia, except as employed for river police and protection of navigation on the Black Sea.

Clauses 3-5.—Cessions of Territories.—Cession to Bulgaria of that part of Dobrudja taken from Bulgaria in 1913, and to the Central Powers of the remainder of Dobrudja to the St. George branch of the Danube mouth; frontier rectifications in favor of Austria as indicated on map; mutual renunciation of indemnities for war costs; an army of occupation at the expense of Rumania.

Clause 6.—Navigation on the Danube.—The Danube Commission to comprise only representatives of states situated on the Danube or the European coasts of the Black Sea, and to control the Danube from Braila downward. Rumania to guarantee free navigation of the Danube to ships of the other contracting parties.

The peace was hailed with joy in Germany as "The petroleum peace." "A land of bread and oil," said *Germania*, "will be provided for Central Europe.

BESSARABIA ANNEXED TO RUMANIA.—Washington, April 22.—The union of Bessarabia with Rumania is "definitive and indissoluble," according to information submitted to the State Department to-day by the Rumanian

Legation. The Rumanian Minister, Dr. Constantin Angelesco, has resigned, and the communication was delivered to the department by the Chargé d'Affaires, N. H. Lahovary, as follows:

"On April 9 the National Assembly of Bessarabia voted by 86 against 3 for union of Bessarabia to Rumania. The Rumanian Premier was then at Kishinov (capital of Bessarabia) and took cognizance of the vote amid enthusiastic acclamation and declared this union to be definitive and indissoluble.

"Bessarabian delegates went to Jassy on April 12 to present the homage of the people of Bessarabia to their Majesties the King and Queen of Rumania. A *Te Deum* was sung at the cathedral in the presence of the royal family, the government and the Bessarabian delegates.

Bessarabia, according to Mr. Lahovary, has about 3,000,000 inhabitants, and more than three-fourths of these are Rumanians. "Bessarabia," he continued, "is one of the richest farm lands of what was formerly Russia. The Bolsheviki ravaged it frightfully during the winter months, and the country was only saved by the Rumanian troops, who were called in by the Bessarabians. Because of this help the Bolsheviki declared war on Rumania, and there were violent clashes between the Bolshevik brigands and Rumanian troops. Finally the latter ousted the Bolsheviki and succeeded in restoring tranquillity, but only after the Bolsheviki had committed most frightful outrages and pillaged the country.

"If Rumania was obliged to make peace, it was due directly to the attitude of the Bolsheviki toward Rumania."—*N. Y. Times*, 23/4.

RUMANIA MUST SELL TO GERMANY.—Amsterdam, May 14.—A Vienna dispatch says that a special economic treaty between Rumania and the Central Empires provides that Rumania will sell to Germany and Austria-Hungary her surplus production in 1918 and 1919 of all kinds of grain, including oil, seeds, and also fodder, pulse, poultry, cattle, fibrous plants, and wool. Rumania also agrees to sell this surplus to the Central Powers for a further period of seven years, if it should be required.—*N. Y. Times*, 15/5.

FINLAND AND RUSSIA'S ARCTIC PORTS

GERMANY AND FINLAND.—The Stockholm correspondent of the *London Times*, writing on March 6, gives the following explanation of the situation in Finland. When Finland asserted her independence, Sweden and the Scandinavian states were the first to give recognition. At the same time, the Aland islanders demanded annexation by Sweden, and King Gustav gave every encouragement to this demand, seeing in Finland as a buffer state and the Aland Islands linked to Sweden, a realization of the aims of Swedish diplomacy.

When a "Red" or Bolshevik revolt broke out against the Finnish Republic, a strong appeal was sent to Sweden for help. Sweden refused, but offered mediation between the Red and White forces, which was accepted only by the Aland islanders. A small Swedish force was sent to the islands, and the Red and White armies agreed to evacuate and leave the disposition of the islands to the peace settlement.

In Finland itself, however, the government made little progress against the Reds. As a last resort an appeal was made to Germany, which at once sent a consignment of arms (Japanese rifles captured in Russia) and a strong naval expedition. The first measure of this force was to establish a base in the Aland Islands, Germany at the same time assuring Sweden that the future of the islands would be settled later by agreement among the

Baltic powers alone. Germany's advantage in the northern Baltic was thus secured through Sweden's policy of non-intervention.

CONTROL OF RUSSIA'S ARCTIC PORTS.—A Moscow dispatch of April 14 stated that 6000 allied troops had been landed at Murmansk to aid in protecting the railroads from the interior of Russia to the sea outlets on the northern coast. Germany, according to a dispatch of April 23, protested to Russia against this action, on the ground that it was a violation of the Brest-Litovsk treaty and that the presence of troops on the Finnish frontier threatened the safety of Finland.

During May, German papers dwelt on Great Britain's alleged plans to take possession of Kola Bay (the harbor of Murmansk), and Finnish Activist papers strongly advocated the conquest of Karelia and even the occupation of Petrograd.

A delayed dispatch from Moscow has revealed the fact that British and French troops have been landed on the Kola Peninsula to aid Russians in protecting the railroads from the interior of Russia to the two main sea outlets in the north—Murmansk and Archangel. Arrows on the above map point to Murmansk, on the Arctic Ocean, where the allied troops were landed and to Kem, where Finnish White Guards, attacking the railway line to Murmansk, were repulsed by the entente forces.—*Baltimore Sun*, 22/4.

ALLIED MEASURES IN THE FAR EAST

MILITARY AGREEMENT BY CHINA AND JAPAN.—Dispatches from China in April gave varied accounts of military negotiations between China and Japan. In the first issue of the *Shanghai Gazette* on April 24 it was stated that these demands were more serious than Japan's demands in 1915, and involved Japanese command of Chinese forces sent into Siberia, Japanese organization of Chinese police, Japanese control of arsenals and dockyards, and special privileges in mining, financial aid, and educational administration.

Washington, May 18.—Official information of the conclusion of a treaty between the Japanese and Chinese Governments for a defensive alliance against Germany has been received at the State Department from Paul S. Reinsch, the American Minister at Peking. Little is known of the details of the agreement, of which it is said generally that it was entered into for the purpose of mutual protection for the duration of the great war.

Although it is not known whether the United States and other allied governments were consulted, it would be a mistake to say that they were not informed of the negotiations of the treaty, which probably marks the beginning of a far-reaching policy that may lead to allied action designed to check the free hand which Germany has assumed in Russia.

While apparently intended primarily to provide against Bolshevik aggressions in Manchuria and other menacing activities of the present ruling faction in Russian territory, the treaty makers are supposed to have had an eye to possible German advance into Siberia through propagandist methods.—*N. Y. Times*, 19/5.

JAPAN AND UNITED STATES IN CONCERT.—Tokio dispatches of April 24, announced the resignation of Viscount Motono, Japanese Minister of Foreign Affairs, and the appointment in his place of Baron Goto. It was stated that the resignation resulted from the arrival in Tokio of the Japanese Ambassador to Russia, Baron Uchida, who opposed a campaign in Siberia and was supported by the Premier.

Baron Goto dispatched to Secretary Lansing a message, appearing in the press on May 8, as follows:

Charged with the direction of foreign affairs in this ministry, owing to the regrettable illness and retirement of Viscount Motono, I need hardly assure you of as firm a determination as ever of this government to promote and cement in every possible way the relations of mutual regard and confidence between our two nations, holding implicit faith in the final victory of our common cause to which we are unalterably committed. I am indeed proud of the privilege that is afforded me of associating myself with you in the great task before us.

Secretary Lansing's reply, also made public at the State Department to-day, follows in part:

I have read with gratification your telegram of yesterday, which expresses so frankly the spirit of goodwill for this country and of devotion to the common cause to which we are pledged.

It is needless to assure your Excellency that your words of confidence and esteem are fully reciprocated by this government. Candor and friendship in all our relations are our supreme wish and purpose; and we feel confident that, guided by this spirit, the United States and Japan will enjoy an even better understanding—if that is possible—than the understanding which to-day characterizes their intercourse.

UNITED STATES SUPPORTS CONSUL AT VLADIVOSTOK.—It was announced on April 26 that M. Tchitcherin, Russian Foreign Minister had requested the United States, Great Britain, and France to remove their consuls at Vladivostok as a result of alleged improper negotiations with the Siberian autonomous government and support of the counter-revolutionary movement. A protest was also addressed to Japan. This protest was coincident with the arrival in Moscow of the German Ambassador, Count von Mirbach. It was regarded by the Allies as a device to force recognition of the Soviet Government.

Secretary Lansing received the protest on May 6, and on May 9 instructed Ambassador Francis to communicate informally a denial of the charges. Ambassador Francis had previously acted in the matter, as indicated by the following Moscow dispatch of April 28:

The Bolshevik demands on Ambassador Francis were: First, the removal of John K. Caldwell, American Consul at Vladivostok; second, investigation of his part in the alleged negotiations with the American Legation at Peking, and third, the attitude of the American Government toward the Soviet republic.

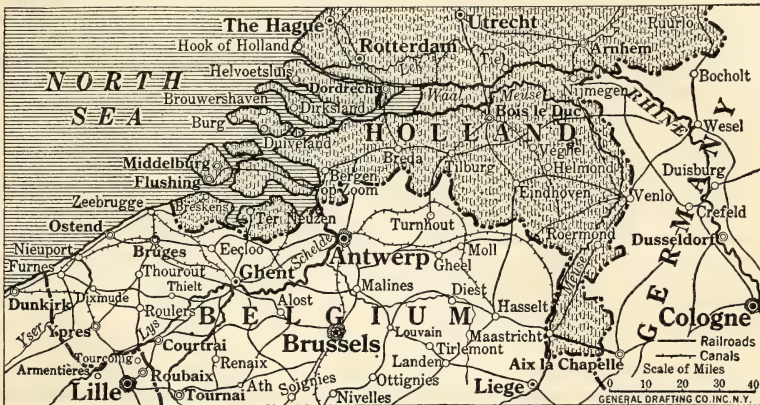
Ambassador Francis has sent a communication to the Bolshevik Government regarding the alleged participation of Americans, French, and British in a Siberian counter-revolt plot in connection with which the Bolsheviks put plainly the question of the recognition of their government. The American Embassy, the note says, carefully scrutinized the documents submitted by the Russian Government. In the American viewpoint, the documents failed to show any connection of American officials in these plots.

The American Embassy, the Ambassador continues, interprets the documents to show only that persons planning a counterrevolt contemplated asking the assistance of Consul Caldwell, Admiral Knight, and the representatives of the Allies in Peking, including the American Minister, but failed to show either the consummation of the hopes of the revolutionaries in this direction, or that the Americans participated or promised aid in any way. It is deemed unfortunate, in the present state of Russian international relations, that such flimsy charges should arise.

Official denial has been made by Japanese Consul Uyeda to the Russian Foreign Office to rumors that the Japanese are placing machine-guns in Vladivostok and are arranging to increase their forces there.—*N. Y. Times*, 5/7.

HOLLAND UNDER GERMAN PRESSURE

In October, 1917, Great Britain protested to Holland against Germany's use of Dutch canals to transport sand and gravel to Belgium, and also copper to be smelted in Belgium. It was contested that Germany's occupation of Belgium was for strictly military purposes, and that the sand and gravel were used for purposes of fortification. In July, 1916, Holland had restricted such transportation to 75,000 tons per month, but this was later increased to 450,000 tons per month.



HOLLAND—THE "NATURAL PROPERTY OF THE GERMAN EMPIRE."

So German Imperialists believe, because the mouths of the Rhine are in Holland; also an irksome wedge of Netherland soil in the south divides Belgium from Germany.

—*Literary Digest*, 11/5.

In April, 1918, following the allied seizure of Dutch ships, Germany renewed her pressure on Holland, demanding not only extension of the sand and gravel agreement but also the privilege of sending supplies over the Limburg railway to Antwerp. This demand was put practically in the form of an ultimatum, and Foreign Minister Loudon on April 25 declared the situation very serious. However, on May 5, Jonkheer Loudon announced that the tension was ended and that Holland had agreed to the transport of 1,600,000 tons of sand and gravel per annum for Belgian roads, without supervision of the use of such materials.

Explaining the strained relations on May 10, Foreign Minister Loudon said:

"The government's reasons for considering the relations which had arisen with Germany as strained lay in the emphasis with which the German Government made known what it demanded from the Dutch Government, some

parts of which demands were immediately seen to be unacceptable. Through her minister here, Germany gave both the Dutch Premier and the Minister of Foreign Affairs to understand that it was a matter which had not been decided without thorough consideration and must be accepted in its entirety as an irreducible minimum.

"The Dutch Minister at Berlin, in particular, was clearly told that if the German demands were not granted the consequences would be most serious for Holland.

"The question of the transit of sand and gravel had been regulated in a manner which encountered no fundamental objections on the part of the Dutch Government. On the other hand, the character of the goods to be transported over the Limburg Railway was in direct conflict with the actual wording of the Dutch proclamation of neutrality. The government decided, therefore, unhesitatingly to oppose this. It was only when the German Government had accepted transport of provisions for the army as the fourth exception, and had agreed to the description of the term 'arms' in accordance with the Dutch conception, that the Dutch Government could drop its objections."

The minister said he was sufficiently convinced that the arrangements now made with Germany respecting the transit, especially of sand and gravel, would not lead to the allied governments putting fresh difficulties in Holland's way. He had informed the British and French Governments of the difficulties which had arisen with Germany, although it was not for a moment a request for their approval.

"These governments," he continued "showed that they fully understood the seriousness of Holland's position. By a joint step taken by their ministers here, who were accompanied by their colleagues of America and Italy, they informed us that for this reason alone, but with absolute maintenance of their standpoint as regards the principle, they would place no difficulties in the way of the Dutch Government in the matter of the arrangements made."—*N. Y. Times*, 12/5.

GREAT BRITAIN DEFENDS SHIP SEIZURES.—London, May 1.—The note of the British Government in reply to the last Dutch note concerning the requisitioning of Dutch shipping gives a detailed survey of the abortive negotiations for an amicable arrangement for the use of Dutch shipping.

The note deals with the allegation of the Netherlands Government that the measure taken only rests on force and contends that the measure taken was simply an exercise of the universally recognized right of sovereignty.

The note concludes with an expression of the hope that the explanations given will remove from the mind of the Netherlands Government and the Dutch people any misconceptions regarding the proceedings of the associated governments, and that it will be realized that the latter have done everything in their power to render the action they were compelled to take, and which, in their opinion, is fully justified under international law, as little injurious as possible to the Netherlands interests.—*Washington Star*, 3/5.

GREAT BRITAIN

LLOYD GEORGE OVERCOMES ARMY OPPOSITION.—A political sensation, rather than a ministerial crisis, arose in England over a letter published in the *London Chronicle* of May 6 by General Maurice, former Director of Military Operations. From this office, which is in reality simply the link between the commanders in the field and the war cabinet, General Maurice had been removed several days before for an indiscreet and unjustified criticism of alleged French failure to support the British forces, in which Haig was compared to Wellington waiting for Blücher at Waterloo. The letter follows:

To the Editor of The Daily Chronicle:

My attention has been called to answers given in the House of Commons on April 23 by Mr. Bonar Law to questions put by R. C. Lambert, Colonel C. R. Burn, and W. M. R. Pringle as to the extension of the British front in France. Those answers contain certain misstatements which, in sum, give a totally misleading impression of what occurred. This is not the place to enter into a discussion as to all the facts, but Hansard's report concludes:

"Mr. Pringle—Was this matter entered into at the Versailles War Council at any time?

"Mr. Bonar Law—That particular question was not dealt with at all by the Versailles War Council."

I was at Versailles when the question was decided by the Supreme War Council, to whom it had been referred.

This is the latest of a series of misstatements which have been made recently in the House of Commons by the present government. On April 9 the Prime Minister said:

"What was the position at the beginning of the battle? Notwithstanding the heavy casualties in 1917, the army in France was considerably stronger on Jan. 1, 1918, than on Jan. 1, 1917. (Hansard, Vol. 104, No. 24, p. 1328.)"

That statement implies that Sir Douglas Haig's fighting strength on the eve of the great battle which began March 21 had not been diminished. This is not correct. Again in the same speech the Prime Minister said:

"In Mesopotamia there is only one white division at all, and in Egypt and Palestine there are only three white divisions. The rest are either Indians or mixed with a very small proportion of British troops in these divisions. I am referring to infantry divisions, *Ibid.*, p. 1327."

This is not correct.

Now, Sir, this letter is not the result of a military conspiracy. It has been seen by no soldier. I am by descent and conviction as sincere a democrat as the Prime Minister, and the last thing I desire is to see the government of our country in the hands of soldiers.

My reasons for taking the very grave step of writing this letter are that the statements quoted above are known to a large number of soldiers to be incorrect, and this knowledge is breeding such a distrust of the government as can only end in impairing the splendid morale of our troops at a time when everything possible should be done to raise it. I have therefore decided, fully realizing the consequences to myself, that my duty as a citizen must override my duty as a soldier, and I ask you to publish this letter in the hope that Parliament may see fit to order an investigation into the statements I have made. I am, Sir, yours, faithfully,

F. MAURICE, Major General.

20 Kensington Park Gardens, May 6, 1918.

On May 7 Mr. Bonar Law announced in the House of Commons that the government proposed to ask two judges to act as a court to investigate the charges immediately. Mr. Asquith, leader of the opposition, offered on the day following a motion that the investigation be made by a Parliamentary Committee. To this the government objected on the ground of avoiding publicity and a prejudiced decision, and Mr. Lloyd George made an effective speech supporting the accuracy of his statements. The Asquith resolution was voted down by a majority of 293 to 106.

General Maurice was retired from the army and afterward accepted the position of military critic for the London *Daily Chronicle*.

GOVERNMENT ARRESTS SINN FEINERS.—London, May 18.—Five hundred Sinn Feiners were arrested at various towns in Ireland to-day, according to a Dublin dispatch to *The Evening News*.

"There have been no disturbances anywhere in the country, as far as is known here," says the dispatch. "Indeed, the most striking feature of the government's coup was its swiftness and thoroughness. All arrangements were carried through like clockwork, dumfounding the Sinn Feiners who boasted that the authorities were afraid to arrest Professor de Valera or any other leaders, and would meddle only with the smaller fry of the organization."

In no case, says the dispatch, was resistance offered to the police and soldiers who made the arrests. The Dublin offices of the Sinn Fein and the offices of the National Aid Fund were taken over by the military.

All the Sinn Fein members of Parliament have been arrested.

Dublin remains quiet, the correspondent adds, but there is a feeling of suppressed excitement.

Documents of great importance in connection with an Irish conspiracy have fallen into the hands of the government through the arrest by coast guards of a man with certain evidence upon him.—*N. Y. Times*, 19/5.

SPAIN

Upon the resignation of the Prieto Cabinet in Spain for the third and as it turned out last time on March 19, a period of confusion ensued in which no party leader would attempt to form a government. As a last resort, an "all star" combination was formed including Maura, Dato, Romanonis, Cambó, and Alba. It remains to be seen how this "regiment of generals" will work together.

The crisis which brought about the government downfall arose over the attempt of telegraph and postal employes to form a junta such as had been used with success by the army, and "hold up" the government for a sum of \$750,000 within 24 hours. The government put the two services under military control and operation, with the result that both services fell into almost hopeless confusion.—Condensed from *Philadelphia Public Ledger*, 21/4.

LATIN-AMERICA

NICARAGUA AND GUATEMALA IN THE WAR.—Guatemala City, April 22.—The National Assembly at its session to-day declared the Republic of Guatemala to occupy the same position toward the European belligerents as does the United States. Guatemala broke off diplomatic relations with Germany in April, 1917.

San Juan Del Sur, Nicaragua, May 7.—Nicaragua to-day declared war on Germany and her allies. The declaration of war was adopted by Congress at the suggestion of President Chamorro, with only four dissenting votes.

Congress also adopted a declaration of solidarity with the United States and the other American republics at war with Germany and Austria, and authorized the President to take steps for utilization to a full measure of the nation's forces in the war.

Nicaragua is the twentieth nation which has declared war against Germany.—*N. Y. Times*, 8/5.

GUATEMALA-HONDURAS BOUNDARY ARBITRATION.—The special missions appointed by Guatemala and Honduras to settle the boundary controversy that has existed between the two countries for many years will arrive in Washington in a few days to begin their conferences through the mediation of the United States, the State Department announced to-day.

In January of this year, the United States Government suggested that each appoint a special plenipotentiary to proceed to the United States and settle the boundary dispute. Guatemala asked the United States to act as mediator.—*N. Y. Herald*, 28/4.

URUGUAY PUZZLED.—According to a statement from Montevideo on May 16, Germany had sent a message informing Uruguay that a state of war did not exist between the two countries. Uruguay's uncertainty arose from the action of a German submarine commander who took a Uruguayan military commission off a Spanish vessel and required pledges before allowing the commission to proceed.

Germany later relieved the commissioners of their pledges, but requested aid in securing passage across French territory of a Chilean mission to Germany. In response to an inquiry, Chile informed Uruguay that she had no desire that this mission should reach its destination.

U. S. IMPORTS FURTHER RESTRICTED

By order of the War Trade Board issued May 14, no licenses for imports to the United States may be granted by our consuls abroad until these licenses have been approved by the War Trade Board. The object of this measure is to prevent unnecessary shipments and to "give the War Trade Board an opportunity of passing upon all importations from a standpoint of enemy trade connection before shipments are put in transit."

REVIEW OF BOOKS

ON

SUBJECTS OF PROFESSIONAL INTEREST

"Field Artillery Officer's Notes." By Caldwell and Danford. \$1.50 net. (New York: E. P. Dutton and Company.)

This notebook contains a considerable amount of important information relating to the administration, organization, transport, training and employment of field artillery.

The text is arranged to facilitate ready and convenient reference, and tables and formulæ have been included to facilitate the computation of firing data.

The methods employed to lay the guns by means of the map and compass are considered in much greater detail than is given to the subject in the Provisional Field Artillery Regulations, 1916, and it appears that the text follows to a considerable extent the methods employed by artillery in Europe in the present war.

With reference to the tables it is noted that in some cases the print is too fine, and in others, notably the table on page 67, the figures are too indistinct for convenience. Effort has apparently been made to crowd the tables, to accommodate one to the page, which is unfortunate; the type should be bold and distinct and easily readable even in a poor light. For this reason the tables should be given as much room as they require.

The form and size of the Note Book is also inconvenient to carry in the blouse pocket, and should be modified to make it handy for this purpose.

This book does not replace the Field Artillery Regulations; in fact there is no claim that it does. A thorough knowledge of the artillery regulations is necessary in any event, and the note book will be most useful to those officers who are familiar with the regulations. Young officers, particularly those who are inexperienced, are too prone to take for granted that a condensed book, such as the Field Note Book, contains all needful information on the subject.

W. P. U.

"Manual for the Use of Troops in Aid of the Civil Authority." By Babcock. Price \$1.00 net. (New York: George H. Doran Company.)

This manual has been prepared specifically for use by the National Guard of New York State. Apparently all laws and statutes relating to the subject have been included, and several extracts from the Army Regulations also appear.

A considerable part of the manual relates to the provisions of the Penal Law and Code of Criminal Procedure, the laws of New York relating to the employment of the National Guard in aid of the Civil Authorities, and compensation and pensions; and consequently these provisions are for the

most part without authority as far as their employment by Federal troops, or the National Guards of other states is concerned.

Probably little relating to the tactical employment of troops on riot duty, not already known to well-informed officers, is contained in the manual.

The psychology of mobs, or mob spirit, which is a matter of considerable importance and should receive some consideration in any work relating to riot duty, has not been covered.

The book, like a number of others on the subject, prescribes that the bayonet should be used as a weapon in handling mobs, particularly during the early stages of a revolt. As a matter of fact it is a bad policy for infantry to come to close quarters with a mob. Unless in force they immediately lose the advantage that their discipline, arms and training give them, and could in many cases be overcome and disarmed by the mob. Cavalry is the arm for close contact with mobs, when it is necessary to come to grips with them.

The danger from the employment of explosives by rioters has been well emphasized in the text, but with regard to automobiles it would not appear that they are of special menace. Rioters as a rule do not own or control automobiles, and are seldom well organized enough to seize them in quantities. Motor cars, however, would be of considerable advantage to the troops and greatly extend their field of usefulness.

In general, while this book may appear to contain a number of unnecessary details and other irrelevant matter, a careful reading of the text will give a broadened grasp of the subject that is of value, particularly in the relations of the military with the civil authorities.

W. P. U.

"Secrets of the Submarine." By Marley Frothingham Hay. Price \$1.25 net. (New York: Dodd, Mead and Company.)

The author's purpose to write a book "for the benefit of the general public and in language which all could understand," has been very well carried out. He has described submarines, their operation, safety devices, etc., in non-technical terms entirely, and they can be easily understood even by a person whose only idea of a submarine is that it is a cigar-shaped object that goes under water and blows up ships. While written primarily for the layman, it will be of great interest to the naval service, especially the chapter "Sphere of the Submarine," which deals with the effect of the submarine on naval policies. The chapter "Submarine Antidotes" is also very interesting and will enlighten those who do not understand why naval operations against submarines, both at their bases and on the high seas, are not entirely successful.

R. C. N.

"Health for the Soldier and Sailor." By Fisher and Fisk. (New York: Funk and Wagnalls Company.)

Thinking men of the country, realizing how human life was wasted by being unnecessarily cut short in peace times by ignorance and vicious modes of living, got together and evolved the Life Extension Institute, the principles of which, evolved and put into effect by medical and scientific men

for peace times, are now found to be far more important in war times. Never before in the history of the world has the maintenance of health been of so much importance, for now it means the conservation of energy expressed in man-power to be expended for the preservation of liberty and civilization, as the Allies understand it and are banded together to maintain it. In this book, "Health for Soldiers and Sailors," the authors, Fisher and Fisk, who are both representatives of the Life Extension Institute, have given a short and concise study of hygiene and its application to war conditions. In this they have been aided by members of the Hygiene Reference Board, which is composed of men at the top of their professions—it is the last word on the subject of health for our fighting men. The book is a veritable *multum in parvo*. From its size one would think that the subjects are only touched upon, but after reading it one is impressed with the amount of knowledge he has gained, and if he has the wisdom to make use of it, the days of the soldier and sailor will be happier and longer and far more useful to his country. Each subject treated should be emphasized, whether the habits of the man, the air he breathes, the food he eats, the water he drinks, or the poisons he should avoid. Special emphasis should be laid on the avoidance of the venereal peril. The damage from this peril is so real and so far-reaching, and has always been such a menace to the health of soldiers and sailors that they ought to know about it and fight it with all that is good and strong and self-respecting in them. Too much cannot be said to enlighten them on the subject of venereal diseases, for the subject is of vast importance in its bearings, whether social, economic or the conservation of man-power at this critical time. The book is an epitome, but is still further boiled down into fifteen Rules of Hygiene—it is worth knowing these for use in our daily lives.

A. M. D. McC.

NOTICE

The U. S. Naval Institute was established in 1873, having for its object the advancement of professional and scientific knowledge in the Navy. It is now in its forty-fifth year of existence, trusting as heretofore for its support to the officers and friends of the Navy. The members of the Board of Control cordially invite the co-operation and aid of their brother officers and others interested in the Navy, in furtherance of the aims of the Institute, by the contribution of papers and communications upon subjects of interest to the naval profession, as well as by personal support and influence.

On the subject of membership the Constitution reads as follows:

ARTICLE VII

Sec. 1. The Institute shall consist of regular, life, honorary and associate members.

Sec. 2. Officers of the Navy, Marine Corps, and all civil officers attached to the Naval Service, shall be entitled to become regular or life members, without ballot, on payment of dues or fees to the Secretary and Treasurer. Members who resign from the Navy subsequent to joining the Institute will be regarded as belonging to the class described in this Section.

Sec. 3. The Prize Essayist of each year shall be a life member without payment of fee.

Sec. 4. Honorary members shall be selected from distinguished Naval and Military Officers, and from eminent men of learning in civil life. The Secretary of the Navy shall be, *ex officio*, an honorary member. Their number shall not exceed thirty (30). Nominations for honorary members must be favorably reported by the Board of Control. To be declared elected, they must receive the affirmative vote of three-quarters of the members represented at regular or stated meetings, either in person or by proxy.

Sec. 5. Associate members shall be elected from Officers of the Army, Revenue Cutter Service, foreign officers of the Naval and Military professions, and from persons in civil life who may be interested in the purposes of the Institute.

Sec. 6. Those entitled to become associate members may be elected life members, provided that the number not officially connected with the Navy and Marine Corps shall not at any time exceed one hundred (100).

Sec. 7. Associate members and life members, other than those entitled to regular membership, shall be elected as follows: "Nominations shall be made in writing to the Secretary and Treasurer, with the name of the member making them, and such nominations shall be submitted to the Board of Control. The Board of Control will at each regular meeting ballot on the nominations submitted for election, and nominees receiving a majority of the votes of the board membership shall be considered elected to membership in the United States Naval Institute."

Sec. 8. The annual dues for regular and associate members shall be two dollars and fifty cents, all of which shall be for a year's subscription to the UNITED STATES NAVAL INSTITUTE PROCEEDINGS, payable upon joining the Institute, and upon the first day of each succeeding January. The fee for life membership shall be forty dollars, but if any regular or associate member has paid his dues for the year in which he wishes to be transferred to life membership, or has paid his dues for any future year or years, the amount so paid shall be deducted from the fee for life membership.

ARTICLE X

Sec. 2. One copy of the PROCEEDINGS, when published, shall be furnished to each regular and associate member (in return for dues paid), to each life member (in return for life membership fee paid), to honorary members, to each corresponding society of the Institute, and to such libraries and periodicals as may be determined upon by the Board of Control.

The PROCEEDINGS are published monthly; subscription for non-members, \$3.00; enlisted men, U. S. Navy, \$2.50. Single copies, by purchase, 30 cents; issues preceding January, 1918, 50 cents.

All letters should be addressed U. S. Naval Institute, Annapolis, Md., and all checks, drafts, and money orders should be made payable to the same.

SPECIAL NOTICE

NAVAL INSTITUTE PRIZE ESSAY, 1919

A prize of two hundred dollars, with a gold medal, and a life-membership (unless the author is already a life member) in the Institute, is offered by the Naval Institute for the best essay on any subject pertaining to the naval profession published in the PROCEEDINGS during the current year. The prize will be in addition to the author's compensation paid upon publication of the essay.

On the opposite page are given suggested topics. Essays are not limited to these topics and no additional weight will be given an essay in awarding the prize because it is written on one of these suggested topics over one written on any subject pertaining to the naval profession.

The following rules will govern this competition:

1. All essays published in the PROCEEDINGS during 1918, which are deemed by the Board of Control to be of sufficient merit, will be passed upon by the Board during the month of January, 1919, and the award for the prize will be made by the Board of Control, voting by ballot.

2. No essay received after November 1 will be available for publication in 1918. Essays received subsequent to November 1, if accepted, will be published as soon as practicable thereafter.

3. If, in the opinion of the Board of Control, the best essay published during 1918 is not of sufficient merit to be awarded the prize, it may receive "Honorable Mention," or such other distinction as the Board may decide.

4. In case one or more essays receive "Honorable Mention," the writers thereof will receive a minimum prize of seventy-five dollars and a life-membership (unless the author is already a life member) in the Institute, the actual amounts of the awards to be decided by the Board of Control in each case.

5. Essays are limited to fifty (50) printed pages in the PROCEEDINGS of the Institute.

6. It is requested that all essays be submitted typewritten and in duplicate; essays submitted written in longhand and in single copy will, however, receive equal consideration.

7. In the event of the prize being awarded to the winner of a previous year, a gold clasp, suitably engraved, will be given in lieu of the gold medal. By direction of the Board of Control.

G. M. RAVENSCROFT,
Lieut. Commander, U. S. N., Secretary and Treasurer.

TOPICS FOR ESSAYS

SUGGESTED BY REQUEST OF THE BOARD OF CONTROL

- "Duties and Responsibilities of Subordinates with Special Reference to the Relations between Commanders-in-Chief and Chief of Naval Operations; Commanders-in-Chief and Force Commanders; Force Commanders and Division Commanders."
- "Initiative of the Subordinate—Its True Meaning."
- "Military Efficiency Dependent upon National Discipline."
- "Governmental Organization for War."
- "Naval Gunnery, Now and of the Future."
- "Naval Policies."
- "The Place of the Naval Officer in International Affairs."
- "Moral Preparedness."
- "Tact in Relation to Discipline."
- "The Principles of Naval Administration in Support of War-Time Operations."
- "What Steps in Organization and Training Should be Taken to Maintain and Increase the Efficiency of the Navy at the Close of the Present War."
- "Responsibilities and Duties of Naval and Military Officers of the United States in Educating and Informing the Public on Professional Matters."
- "A Commission in The Navy: Its Meaning and the Obligations Which It Involves."
- "The Relations of an Officer to his Subordinate, Both Commissioned and Enlisted."
- "The True Meaning of the Expression 'An Officer and a Gentleman.'"

LIST OF PRIZE ESSAYS

"WHAT THE NAVY HAS BEEN THINKING ABOUT"

1879

Naval Education. Prize Essay, 1879. By Lieut. Commander A. D. Brown, U. S. N.

NAVAL EDUCATION. First Honorable Mention. By Lieut. Commander C. F. Goodrich, U. S. N.

NAVAL EDUCATION. Second Honorable Mention. By Commander A. T. Mahan, U. S. N.

1880

"The Naval Policy of the United States." Prize Essay, 1880. By Lieutenant Charles Belknap, U. S. N.

1881

The Type of (I) Armored Vessel, (II) Cruiser Best Suited to the Present Needs of the United States. Prize Essay, 1881. By Lieutenant E. W. Very, U. S. N.

SECOND PRIZE ESSAY, 1881. By Lieutenant Seaton Schroeder, U. S. N.

1882

Our Merchant Marine: The Causes of Its Decline and the Means to Be Taken for Its Revival. "Nil clarius aquis." Prize Essay, 1882. By Lieutenant J. D. Kelley, U. S. N.

"MAIS IL FAUT CULTIVER NOTRE JARDIN." Honorable Mention. By Master C. G. Calkins, U. S. N.

"SPERO MELIORA." Honorable Mention. By Lieut. Commander F. E. Chadwick, U. S. N.

"CAUSA LATET: VIS EST NOTISSIMA." Honorable Mention. By Lieutenant R. Wainwright, U. S. N.

1883

How May the Sphere of Usefulness of Naval Officers Be Extended in Time of Peace with Advantage to the Country and the Naval Service? "Pour encourager les Autres." Prize Essay, 1883. By Lieutenant Carlos G. Calkins, U. S. N.

"SEMPER PARATUS." First Honorable Mention. By Commander N. H. Farquhar, U. S. N.

"CULIBET IN ARTE SUA CRENDUM EST." Second Honorable Mention. By Captain A. P. Cooke, U. S. N.

1884

The Reconstruction and Increase of the Navy. Prize Essay, 1884. By Ensign W. I. Chambers, U. S. N.

1885

Inducements for Retaining Trained Seamen in the Navy, and Best System of Rewards for Long and Faithful Service. Prize Essay, 1885. By Commander N. H. Farquhar, U. S. N.

1886

What Changes in Organization and Drill Are Necessary to Sail and Fight Effectively Our Warships of Latest Type? "Scire quod nescias." Prize Essay, 1886. By Lieutenant Carlos G. Calkins, U. S. N.

THE RESULT OF ALL NAVAL ADMINISTRATION AND EFFORTS FINDS ITS EXPRESSION IN GOOD ORGANIZATION AND THOROUGH DRILL ON BOARD OF SUITABLE SHIPS. Honorable Mention. By Ensign W. L. Rodgers, U. S. N.

1887

The Naval Brigade: Its Organization, Equipment and Tactics. "In hoc signo vinces." Prize Essay, 1887. By Lieutenant C. T. Hutchins.

1888

Torpedoes. Prize Essay, 1888. By Lieut. Commander W. W. Reisinger, U. S. N.

1891

The Enlistment, Training and Organization of Crews for Our Ships of War. Prize Essay, 1891. By Ensign A. P. Niblack, U. S. N.

DISPOSITION AND EMPLOYMENT OF THE FLEET: SHIP AND SQUADRON DRILL. Honorable Mention, 1891. By Lieutenant R. C. Smith, U. S. N.

1892

Torpedo-boats: Their Organization and Conduct. Prize Essay, 1892. By Wm. Laird Clowes.

1894

The U. S. S. Vesuvius, with Special Reference to Her Pneumatic Battery. Prize Essay, 1894. By Lieut. Commander Seaton Schroeder, U. S. N.

NAVAL REFORM. Honorable Mention, 1894. By Passed Assistant Engineer F. M. Bennett, U. S. N.

1895

Tactical Problems in Naval Warfare. Prize Essay, 1895. By Lieut. Commander Richard Wainwright, U. S. N.

A SUMMARY OF THE SITUATION AND OUTLOOK IN EUROPE. An Introduction to the Study of Coming War. Honorable Mention, 1895. By Richmond Pearson Hobson, Assistant Naval Constructor, U. S. N.

SUGGESTIONS FOR INCREASING THE EFFICIENCY OF OUR NEW SHIPS. Honorable Mention, 1895. By Naval Constructor Wm. J. Baxter, U. S. N.

THE BATTLE OF THE YALU. Honorable Mention, 1895. By Ensign Frank Marble, U. S. N.

1896

The Tactics of Ships in the Line of Battle. Prize Essay, 1896. By Lieutenant A. P. Niblack, U. S. N.

THE ORGANIZATION, TRAINING AND DISCIPLINE OF THE NAVY PERSONNEL AS VIEWED FROM THE SHIP. Honorable Mention, 1896. By Lieutenant Wm. F. Fullam, U. S. N.

NAVAL APPRENTICES, INDUCEMENTS, ENLISTING AND TRAINING. The Seaman Branch of the Navy. Honorable Mention, 1896. By Ensign Ryland D. Tisdale, U. S. N.

THE COMPOSITION OF THE FLEET. Honorable Mention 1896. By Lieutenant John M. Ellicott, U. S. N.

1897

Torpedo-boat Policy. Prize Essay, 1897. By Lieutenant R. C. Smith, U. S. N.

A PROPOSED UNIFORM COURSE OF INSTRUCTION FOR THE NAVAL MILITIA. Honorable Mention, 1897. By H. G. Dohrman, Associate Member, U. S. N. I.

TORPEDOES IN EXERCISE AND BATTLE. Honorable Mention, 1897. By Lieutenant J. M. Ellicott, U. S. N.

1898

- Esprit de Corps: A Tract for the Times.** Prize Essay, 1898. By Captain Caspar Frederick Goodrich, U. S. N.
- OUR NAVAL POWER.** Honorable Mention, 1898. By Lieut. Commander Richard Wainwright, U. S. N.
- TARGET PRACTICE AND THE TRAINING OF GUN CAPTAINS.** Honorable Mention, 1898. By Ensign R. H. Jackson, U. S. N.

1900

- Torpedo Craft: Types and Employment.** Prize Essay, 1900. By Lieutenant R. H. Jackson, U. S. N.
- THE AUTOMOBILE TORPEDO AND ITS USES.** Honorable Mention, 1900. By Lieutenant L. H. Chandler, U. S. N.

1901

- Naval Administration and Organization.** Prize Essay, 1901. By Lieutenant John Hood, U. S. N.

1903

- Gunnery in Our Navy.** The Causes of Its Inferiority and Their Remedies. Prize Essay, 1903. By Professor Philip R. Alger, U. S. N.
- A NAVAL TRAINING POLICY AND SYSTEM.** Honorable Mention, 1903. By Lieutenant James H. Reid, U. S. N.
- SYSTEMATIC TRAINING OF THE ENLISTED PERSONNEL OF THE NAVY.** Honorable Mention, 1903. By Lieutenant C. L. Hussey, U. S. N.
- OUR TORPEDO-BOAT FLOTILLA.** The Training Needed to Insure Its Efficiency. Honorable Mention, 1903. By Lieutenant E. L. Beach, U. S. N.

1904

- The Fleet and Its Personnel.** Prize Essay, 1904. By Lieutenant S. P. Fullinwider, U. S. N.
- A PLEA FOR A HIGHER PHYSICAL, MORAL AND INTELLECTUAL STANDARD OF THE PERSONNEL FOR THE NAVY.** Honorable Mention, 1904. By Medical Inspector Howard E. Ames, U. S. N.

1905

- American Naval Policy.** Prize Essay, 1905. By Commander Bradley A. Fiske, U. S. N.
- THE DEPARTMENT OF THE NAVY.** Honorable Mention, 1905. By Rear Admiral Stephen B. Luce, U. S. N.

1906

- Promotion by Selection.** Prize Essay, 1906. By Commander Hawley O. Rittenhouse, U. S. N.
- THE ELEMENTS OF FLEET TACTICS.** First Honorable Mention, 1906. By Lieut. Commander A. P. Niblack, U. S. N.
- GLEANINGS FROM THE SEA OF JAPAN.** Second Honorable Mention, 1906. By Captain Seaton Schroeder, U. S. N.
- THE PURCHASE SYSTEM OF THE NAVY.** Third Honorable Mention, 1906. By Pay Inspector J. A. Mudd, U. S. N.

1907

- Storekeeping at the Navy Yards.** Prize Essay, 1907. By Pay Inspector John A. Mudd, U. S. N.
- BATTLE REHEARSALS.** A Few Thoughts on Our Next Step in Fleet-Gunnery. First Honorable Mention, 1907. By Lieut. Commander Yates Stirling, U. S. N.
- THE NAVAL PROFESSION.** Second Honorable Mention, 1907. By Commander Bradley A. Fiske, U. S. N.

1908

- A Few Hints to the Study of Naval Tactics.** Prize Essay, 1908. By Lieutenant W. S. Pye, U. S. N.
- THE MONEY FOR THE NAVY.** First Honorable Mention, 1908. By Pay Inspector John A. Mudd, U. S. N.
- THE NATION'S DEFENCE—THE OFFENSIVE FLEET.** How Shall We Prepare It for Battle? Second Honorable Mention, 1908. By Lieut. Commander Yates Stirling, U. S. N.

1909

- Some Ideas about Organization on Board Ship.** Prize Essay, 1909. By Lieutenant Ernest J. King, U. S. N.
- THE NAVY AND COAST DEFENCE.** Honorable Mention, 1909. By Commodore W. H. Beehler, U. S. N.
- THE REORGANIZATION OF THE NAVAL ESTABLISHMENT.** Honorable Mention, 1909. By Pay Inspector J. A. Mudd, U. S. N.
- A PLEA FOR PHYSICAL TRAINING IN THE NAVY.** Honorable Mention, 1909. By Commander A. P. Niblack, U. S. N.

1910

- The Merchant Marine and the Navy.** Prize Essay, 1910. By Naval Constructor T. G. Roberts, U. S. N.
- THE NAVAL STRATEGY OF THE RUSSO-JAPANESE WAR.** Honorable Mention, 1910. By Lieutenant Lyman A. Cotton, U. S. N.

1911

- Navy Yard Economy.** Prize Essay, 1911. By Paymaster Charles Conard, U. S. N.
- NAVAL POWER.** Honorable Mention, 1911. By Captain Bradley A. Fiske, U. S. N.
- WANTED—FIRST AID.** Honorable Mention, 1911. By Commander C. C. Marsh, U. S. N.

1912

- Naval Might.** Prize Essay, 1912. By Lieutenant Ridgely Hunt, U. S. N. (retired).
- INSPECTION DUTY AT THE NAVY YARDS.** Honorable Mention, 1912. By Lieut. Commander T. D. Parker, U. S. N.

1913

- The Greatest Need of the Atlantic Fleet.** Prize Essay, 1913. By Lieut. Commander Harry E. Yarnell, U. S. N.
- NAVY DEPARTMENT ORGANIZATION.** A Study of Principles. First Honorable Mention, 1913. By Commander Yates Stirling, Jr., U. S. N.
- TRAINED INITIATIVE AND UNITY OF ACTION.** Second Honorable Mention, 1913. By Lieut. Commander Dudley W. Knox, U. S. N.

1914

- The Great Lesson from Nelson for To-day.** Prize Essay, 1914. By Lieut. Commander Dudley W. Knox, U. S. N.
- NAVAL POLICY AS IT RELATES TO THE SHORE ESTABLISHMENT AND THE MAINTENANCE OF THE FLEET.** Honorable Mention, 1914. By Captain John Hood, U. S. N.
- OLD PRINCIPLES AND MODERN APPLICATIONS.** Honorable Mention, 1914. By Lieut. Commander Dudley W. Knox, U. S. N.
- MILITARY PREPAREDNESS.** Honorable Mention, 1914. By Naval Constructor Richard D. Gatewood, U. S. N.

1915

- The Rôle of Doctrine in Naval Warfare.** Prize Essay, 1915. By Lieut. Commander Dudley W. Knox, U. S. N.
- AN AIR FLEET: OUR PRESSING NAVAL WANT.** First Honorable Mention, 1915. By Lieut. Commander Thomas Drayton Parker, U. S. N.
- TACTICS.** Second Honorable Mention, 1915. By Ensign H. H. Frost, U. S. N.
- DEFENCE AGAINST SURPRISE TORPEDO ATTACK.** Third Honorable Mention, 1915. By Ensign R. T. Merrill, 2d, U. S. N.

1916

- The Moral Factor in War.** Prize Essay, 1916. By Lieutenant (J. G.) H. H. Frost, U. S. N.
- NAVAL PERSONNEL.** First Honorable Mention, 1916. By Lieut. Commander J. K. Taussig, U. S. N.
- EDUCATION AT THE U. S. NAVAL ACADEMY.** Second Honorable Mention, 1916. By Lieutenant Ridgely Hunt, U. S. N.
- SOME UNDERLYING PRINCIPLES OF MORALE.** Third Honorable Mention, 1916. By Commander Dudley W. Knox, U. S. N.
- LARGE vs. A GREATER NUMBER OF SMALLER BATTLESHIPS.** Lippincott Prize Essay. By Lieut. Commander Thomas Lee Johnson, U. S. N.

1917

- Commerce Destroying in War.** Prize Essay, 1917. By Commander Lyman A. Cotten, U. S. Navy.
- THE PEOPLE'S RÔLE IN WAR.** First Honorable Mention, 1917. By Lieutenant H. H. Frost, U. S. Navy.
- THE NATION'S GREATEST NEED.** Second Honorable Mention, 1917. By Colonel Dion Williams, U. S. Marine Corps.

1918

- Letters on Naval Tactics.** Prize Essay, 1918. By Lieutenant H. H. Frost, U. S. N.
- THE PREPAREDNESS OF THE FUTURE.** First Honorable mention, 1918. By Commander H. O. Rittenhouse, U. S. N. Retired.
- NAVAL STRATEGY.** Second Honorable Mention, 1918. By Rear Admiral Bradley A. Fiske, U. S. N.





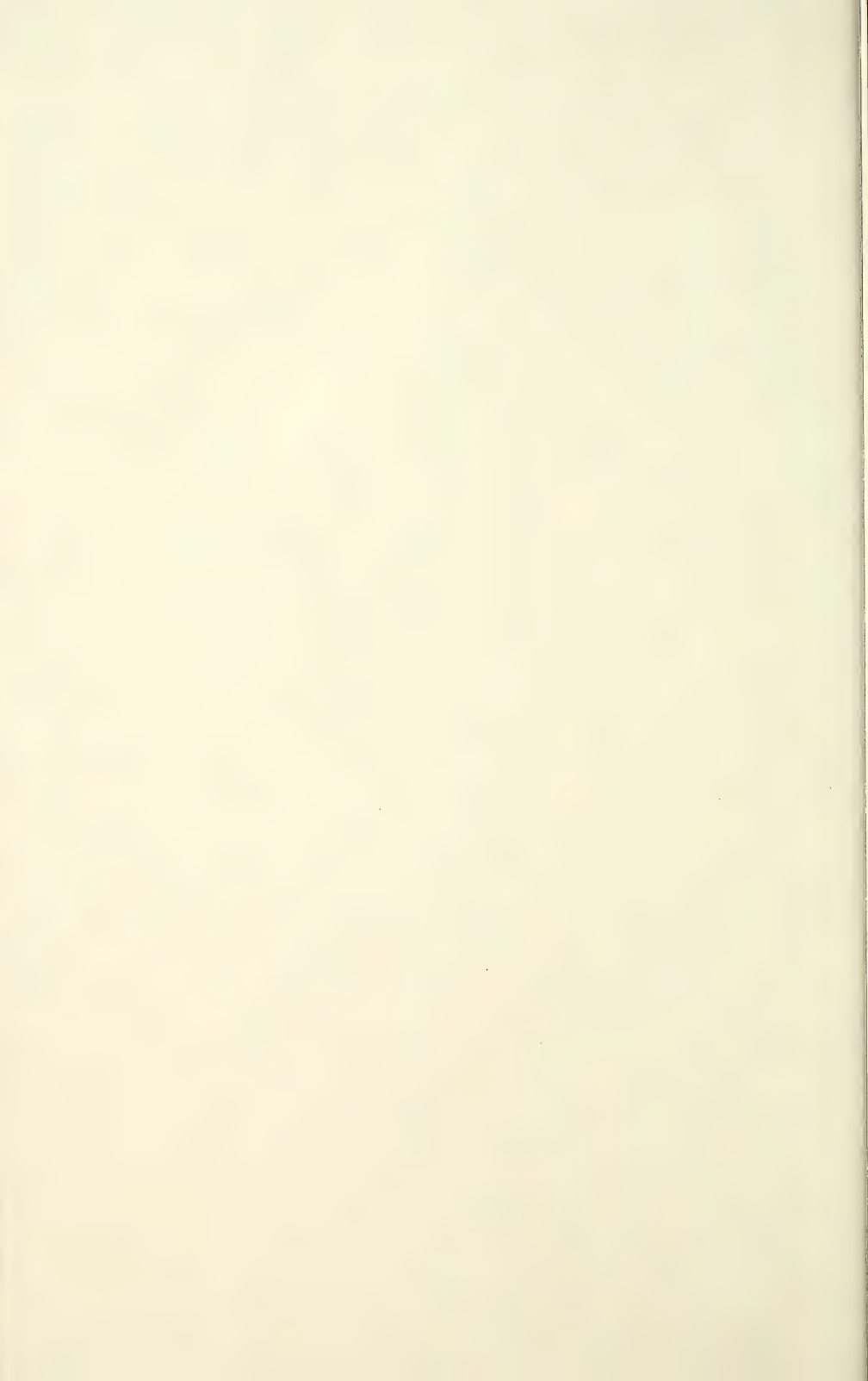


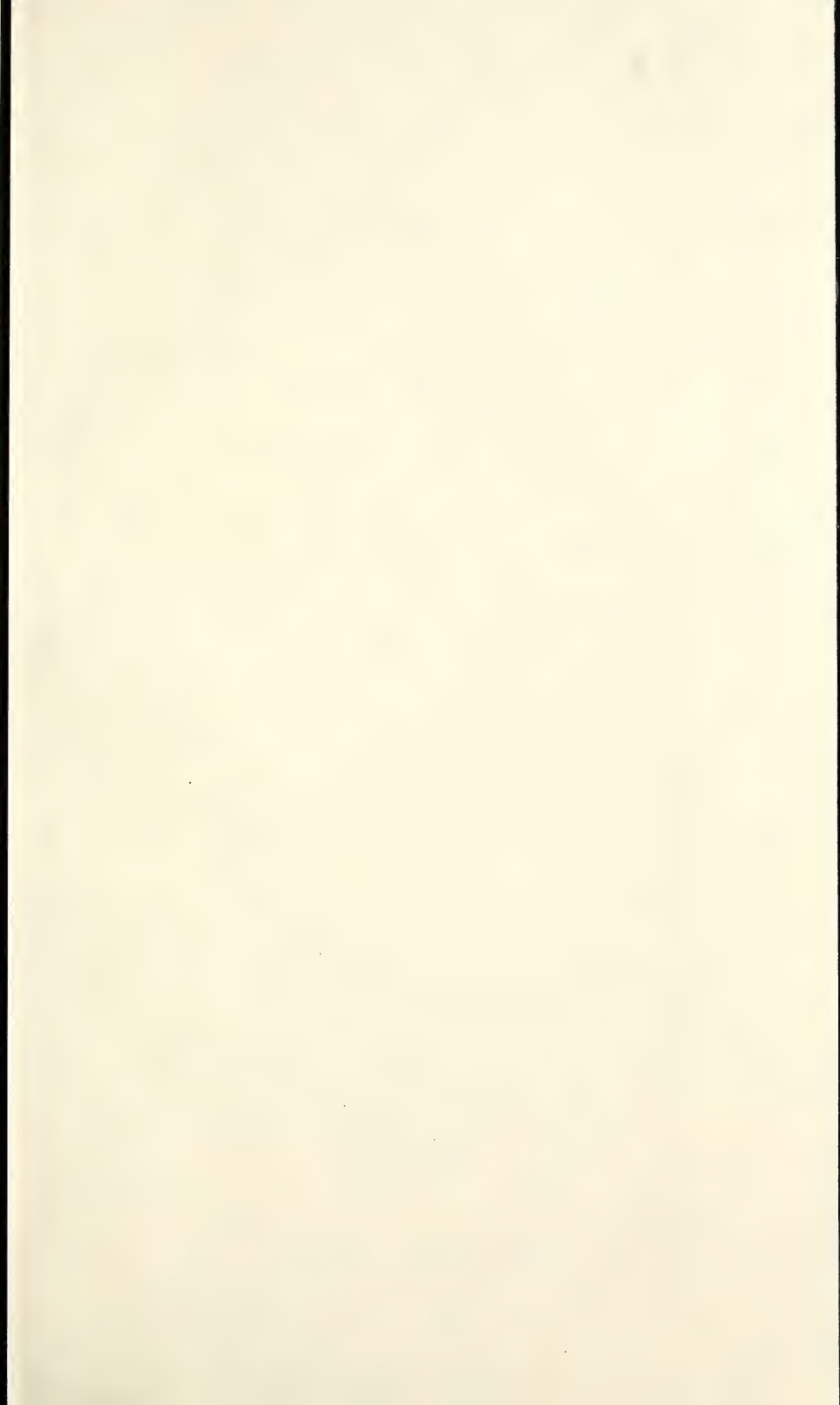














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